The Chemical Age

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The Chemist and His Hire

A GLANCE at advertisement columns notifying vacancies in the various branches of the chemical industry must impress those unfamiliar with the industry with the low salary figures offered for the high qualifications required. This is not a new development, but rather the conditions are slightly better than they were a few years ago. Nevertheless, a young chemist leaving the university to-day finds that for an honours degree in chemistry, he can expect to earn a commencing salary of £250 to £300 per annum. For most of these appointments, research and industrial experience and knowledge of foreign languages are cited as advantages in the advertisement, but he knows very well that he stands little chance of obtaining the appointment without them. He is so often required to possess industrial experience, but there is difficulty in obtaining it.

Occasionally he comes across an unpleasant device; he is asked to state the salary he requires. This immediately puts the young graduate in a quandary, for he has to try and guess the attitude of the prospective employer. Does the employer want any kind of a chemist, the sole factor determining his choice being the smallest salary asked; or is he the type that is willing to pay for a good man and considers it a point in the favour of the applicant who is not afraid to assess himself at a good figure? These are the kind of questions that the applicant has to ask himself. Whether he will ask for what he considers to be a salary commensurate to his qualifications or for a higher or lower figure will depend on the necessity of his obtaining a post as quickly as possible, the advantages of gaining industrial experience even at a low rate of remuneration in order to use it later as a means of obtaining a better appointment, and similar considerations.

In any event, the conditions are unfair to the applicant. It is surely up to the employer in filling a vacancy, or creating a new post, in his organisation to determine the type of man necessary to do the work he has in mind and the magnitude of the salary he is prepared to pay. Even if he is unable to arrive at an exact figure it is better to give a salary range between an upper and lower limit than leave the applicant to state his own terms. Totally unsuited applications are thus eliminated, saving a waste of time both for the employer and the applicant. Of course, when a man is required for some very specialised form of work, it is almost impossible to announce a definite figure and his remuneration is best decided by discussion.

On the whole, no blame can be attached to the employer. He is not in business for philanthropic reasons and if he finds that he can obtain a suitable man at what would appear to be a low salary, it is from his point of view a sheer waste of money to pay more. To do so would be just as ridiculous as offering to buy his process raw materials at a higher price than that listed by his suppliers. But as the new material and other commodity prices fluctuate according to the law of supply and demand, the prices of the human raw materials of the chemical industry must be very largely determined by the same rule. But in this case it is extremely difficult to visualise how a check on the supply could be imposed, at the same time ensuring that the science sustained no loss. For any decrease in the number of chemists available, though raising the standard of their potential remuneration, would be certain to result in a decrease in the number at work.

It is fortunate, therefore, that a salient characteristic of the true chemist is a deep inborn love of the subject. So long as he is doing chemistry he is perfectly happy and does not appear to mind what he earns, within reason. Appointments registrars of the scientific societies have done, and are doing, useful work in refusing to circulate to their members details of posts carrying undesirably low salaries and in other ways improving the status of the chemist. But there is a long road to travel before the chemist's remuneration approaches that of some other professions which charge 6s. 8d. for writing a letter or two guineas for a short consultation.

The chemical profession is often compared with other professions such as the law and medicine. There are unfortunate failures in all professions and any comparison which is made must be based on the average remuneration. Some professions are at once seen to be outstandingly wealthy; the chemical profession is not in this category. There appear to be no fundamental reasons for this distinction; one fact however emerges, those professions which carry on their business directly with the public are those which obtain the highest rewards.

It must be deplored that chemistry has not yet acquired that material recognition which is its due. It is only by united effort in educating public opinion that its claims will be brought home to the uninitiated.

—Richard B. Pilcher.

Notes and Comments

The Nutritive Value of Stored Foods

THE chemist has played an important part in the development of the modern methods of food storage, such as cold storage, gas storage and canning, and the quality of the stored product is now perfectly reliable. But there still remains considerable prejudice in the public mind against the use of stored food. The Food Investigation Board has asked the Medical Research Council whether or not stored foods are as nutritious as fresh foods, the reply being published in the Board's annual report. The Council states that it is impossible to give a categorical answer but it concludes that " the available evidence suggests that modern methods of storing foods cause little depreciation in their nutritive value; in fact it may be said that food of good initial quality that has been stored by the best modern methods is likely to be superior in many respects to similar food that, though still technically fresh, is in reality stale." This should be a reassurance to the public, and incidentally an authoritative acknowledgment of the technical skill of modern storage methods. The latter part of the statement quoted is a pointer to one of the major functions of stored food.

Evening Classes

THE end of this month will see the opening of the season for scientific meetings and evening classes. Evening classes are, of course, of two kinds; student courses, such as those given at the Regent Street Polytechnic and the Sir John Cass Technical Institute, for the degree examinations and the Associateship of the Institute of Chemistry, and specialised courses for those engaged in industry, in some cases being designed for those intending to take the Fellowship of the Institute of Chemistry examination. For instance, the Hackney Technical Institute provides courses of instruction in such subjects as chemical works practice, water technology, modern analytical methods, chemistry of paints, pigments and varnishes, and chemistry of essential oils and perfumes. In addition, there are two new courses next session on industrial bacteriology and mycology and on industrial distillation respectively. The practice of evening instruction has now so developed that there are available in London and the provinces courses to suit the requirements of almost every branch of the chemical industry.

New Sleep-Inducing Agents

ONE of the branches of medicinal chemistry in which the chemist has been most active is in the search for sleep-inducing compounds which are relatively non-toxic and are not habit-forming. Considerable success has been obtained in the field of barbituric acid derivatives with the production of compounds such as medinal (barbitone soluble) and luminal (phenobarbitone). In a paper presented at this week's meeting of the American Chemical Society by Drs. A. C. Cope and E. M. Hancock, the preparation of a series of new barbituric acid derivatives in the substituted vinyl barbituric acids is described. Apparently difficulty has previously been experienced in preparing this class containing substituted vinyl groups attached to the barbituric acid nucleus by the conventional methods of synthesis owing to the inactivity of the vinyl halides. The authors have now shown that the condensation products of aliphatic ketones with malonic and cyanoacetic esters, when treated with sodium, a sodium alkoxide, or sodamide, are isomerised into the sodium derivatives of substituted vinyl esters. The latter on treatment with alkylating agents give dialkyl substituted esters in which one substituent is a substituted vinyl group. The resulting esters can be condensed with urea and its derivatives to give barbituric acids containing a substituted vinyl group. More than forty of these new substituted vinyl barbituric acids were prepared by this method and it was found that the new compounds produced either brief, moderate, or long sleep or sedation, according to the structure of the specific substituted vinyl group and the nature of the other alkyl group present in the molecule. Compounds containing substituted vinyl groups introduced through methyl ethyl and methyl propyl ketones were particularly effective hypnotics with relatively low toxicity to experimental animals used in the tests. The action of the substituted vinyl group is interesting. Several years ago, Watermann in Holland, discovered that divinyl ether gave as complete anæsthesia as that induced by ether and chloroform and at the same time was non-toxic; a great advantage over the two latter anæsthetics. It was not widely used, however, as it was unstable and polymerised on standing for any length of time. It may well be that the presence of vinyl or substituted vinyl groups would tend to confer hypnotic properties on the compounds in which they are combined.

A Coal Hydrogenation Process

IN another paper to the meeting, Dr. H. H. Storch, of the U.S. Bureau of Mines, outlined the coal hydrogenation process used at the Bureau's experimental plant. The process usually consists of two stages. In the first or liquid phase stage, the powdered coal is mixed with a small amount (about 1/10 per cent.) of a catalyst such as tin sulphide, and an equal weight of heavy oil. The mixture is then pumped into a converter at 850° F. together with hydrogen at a pressure of about 3,000 pounds per sq. in. The products of this stage consist of a small amount of gasoline, a larger amount of a middle oil similar to kerosene in its boiling range, a heavy oil which is recycled to the start of the process for mixing with fresh coal, and a residue made up of the ash and the more resistant carbonaceous portions of the coal. In the second or vapour-phase stage the middle oil from the first stage is vaporised and, together with hydrogen under pressure, is passed over a fixed catalyst such as tungsten disulphide. The product of this stage is petrol.

A Guide to the New Safety Requirements

THE new Factories Act has introduced many entirely new provisions and made several important amendments to the previously existing law, so that a careful study of its text is necessary. This is not an easy task, but it has been simplified by some excellent books which have already appeared acting as guides to the Act, comparing it with the old law, and giving explanatory and other useful information generally. A novel and helpful form of guide to the major safety provisions of the new Act is used in a pamphlet of Safety Tables and Memoranda now issued by the National Safety First Association. It takes the form of a series of questions designed to ascertain whether the necessary action has been taken in connection with, at any rate, those safety sections which are new or in which there has been a major alteration or extension. The number of the relevant section of the Act is given in brackets at the end of the question. The pamphlet also contains tabular statements summarising all the major requirements of the more complex sections.

Some Finishing Problems in the Dyeing Industry

By
D. A. MARTIN

FOR some years the writer has been investigating various finishing problems in certain branches of the dyeing industry with the result that new uses have been discovered for certain compounds, mostly of vegetable origin. In discussing various chemicals and their utility in the finishing of certain types of dyed materials, it would be best to define some of the major problems facing certain sections of the trade, together with the latest means of overcoming them.

Finishing Dyed Hat Ribbon

First, there is the large section handling mixed fibres of the cotton/viscose type—not so much the piece dyeing and finishing, which is quite well catered for, but rather the branch dealing in hat ribbon dyeing and finishing—in itself a relatively large branch, although it is centred in one or two towns only. At first glance the finishing problem here seems a simple one, but the dyers find that after they have matched a given batch of ribbon to the desired shade, it is frequently sent off shade in the finishing department.

The requirements regarding finish do not vary to any degree, being a certain amount of body with a comparatively high degree of stiffening and freedom from marking when folded. Nor are there innumerable qualities of cotton/viscose ribbon with which to contend. Consequently the dyer knows which are going to receive more finishing than others, and can allow accordingly, but unfortunately he can never tell, with any degree of certainty, whether the finishing department are going to make a given quality darker, lighter, or occasionally effect no change. This is a peculiar fact for which, so far, no explanation has been found. Obviously a finishing bath is required the constituents of which, while fulfilling all requirements as to stiffness, etc., do not upset the shade of the dyed material in any way.

Until recently, and still in many cases, a medium quality gum arabic was used, together with additions of turkey red oil, glycerine and like substances. From the finishers point of view this was an ideal medium, as it was comparatively easy to let down into solution, having a wide and flexible range of stiffening powers combined with sufficient body; but it often upset the shade one way or another.

A wide range of substitutes was tried with varying success, of which an extract from the carob bean showed the most promise. It is possible to manufacture a stiffening medium from the bean which, in conjunction with certain chlorides and gum extracts, is now being recognised as an ideal finishing product for this class of goods. The ground endosperm of the bean is used, but the process of production is in itself a different problem and only a few firms specialise in preparing the powder. There is to the writer's knowledge only one actual product on the market incorporating this substance and produced solely with a view to meeting the requirements of the ribbon finishing trade, although carob bean gum is marketed, by itself, under two or three different trade names. The special finishing medium incorporating this gum among other things, gives an amazingly good result. The shades of the ribbons remain unchanged and have an ideal stiffness and handle.

Carob Bean Gum Itself Useless

In the first place carob bean gum was tried out alone, but by itself it is quite useless for this class of goods. It produces extremely viscous solutions at very low concentrations, thus making it quite impossible to obtain anything approaching the required degree of stiffness, as it is quite impracticable to work with anything but a very mobile liquid.

There may be yet a further use for the carob bean. It appears from tests carried out so far that the bean meal, consisting of the pod, husk and endosperm in a ground state, can also produce a satisfactory finishing medium. Naturally the endosperm is still present, but as there are no difficulties attached to grinding the entire pod, and also as the percentage yield per pound of meal is relatively high, a very much cheaper product can be produced. Further tests are being carried out and the results should prove of interest to manufacturers of finishes and chemicals used in finishing.

Another important problem is encountered in finishing certain hosiery. It is well known that the hosiery trade produces very large quantities of natural silk stockings, having cotton feet and welts, at a very low figure. Actually from figures obtained, it would appear that about two ounces of silk per dozen pairs of hose are used. From this it can be readily understood that in order to make them hold their shape, the stockings must be stiffened in some way. This would present little difficulty but for the cotton present. This must neither be stiffened, thus becoming boardy and harsh to handle, nor lose its elasticity. The problem here is very apparent. Some means of stiffening the silk panel without affecting the cotton welt is required. Also whatever stiffening medium is used, it must be of a non-tacky nature, otherwise the hose would stick to the forms in the press and would tend either to hole or ladder on being pulled off.

An extract of soya bean appears to have very great affinity for natural silk, and gives sufficient stiffening without causing any stickiness on the forms. A product of this nature is now being marketed, having soya extract as a base. Incorporated with it are certain chlorides, which may be surprising at first in view of their tendering effect on natural silk. The reason appears to be as follows:—The silk readily takes up the soya extract, and at the same time the cotton absorbs the chlorides in preference to the extract with the result that the silk panel obtains the desired degree of stiffness and the cotton welt remains unchanged. The chlorides are present in a sufficiently low concentration to preclude any risk of detriment to the silk.

Stiffening Felt Hats

Another process connected with finishing, though from a slightly different angle, is the stiffening of wool and fur felt hats. In this country the trade appears to be remarkably conservative regarding the materials used and somewhat averse to trying out anything new. The basis of the stiffening or proofing solution is shellac, which is dissolved in a weak borax or ammonia solution applied to the hoods by padding. It is a very satisfactory stiffening medium, as far as actual stiffening powers are concerned, but it has one drawback. Unless after padding the steaming process is extremely well carried out, the hats are most liable to mark, and if scratched appear whitish on the surface. In Australia, shellac proofing has been superseded to a large extent by carob bean gum. In this case the actual gum obtained from the ground endosperm is used without any admixtures, and while giving adequate stiffening has greater flexibility and freedom from marking. This process still remains to be developed in this country apparently.

There are two further problems which have not yet been really satisfactorily solved; they concern the fur dyeing industry. With certain furs it would be considered ideal if the leather could be so treated that it would remain unaffected by the dye solution. With furs having very thick pelts it is possible to take sufficient surface leather off after dyeing, to reach the white pelt to which the dye has not penetrated, but with some of the valuable furs, such as the martens, the thickness of the pelt does not allow this to be done.

At first an attempt was made to waterproof the leather before dyeing, but as, during the dyeing process the furs are subjected to fairly strong alkalis, this did not give

satisfactory results. Experiments are now being carried out using latex as a base. The idea being to coat the entire leather surface with a rubber film, prior to the dyeing processes. The film is peeled off afterwards, leaving in theory a perfectly white pelt. Latex by itself is of no practical value, but in the vulcanised form it seems to be giving satisfactory results.

The other problem concerns the top or guard hair of practically all furs. This hair under certain conditions curls over at the extreme tip, or in bad cases actually has the appearance of being singed. Excessive heat, or continual handling are the two main causes of this complaint, which incidentally can cause very great losses to the fur trade. The fur dyer, of course, unless extreme care is taken, is liable to bring about this fault during the drying processes, etc. So far no one has been able to find a lasting remedy, although it is possible to effect a temporary cure by using a gum, such as tragacanth, in a spirit solution. From one or two brief tests it seems likely that an exploration of the use of urea-formaldehyde resins, either applied as such or formed *in situ*, might give interesting results.

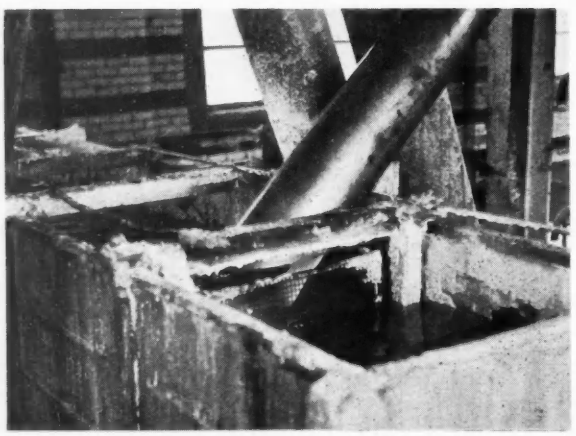
It should not be supposed that the above are the only finishing problems arising in the dyeing industry, they are merely some of the rather more interesting ones. Their solution would appear to be found in the use of the lesser known vegetable gums. The two fur finishing problems are set down with the main reason of pointing out to manufacturers two likely new fields of research that would become very lucrative in the event of a solution being found for either or both of them.

Monel Metal in the Salt Industry

Obtaining a Product of High Purity and Whiteness

THE equipment required by salt producers involves metallurgical problems of a special order. Salt is essentially a corrosive substance under the conditions involved in its production and it is also seriously abrasive. The salt manufacturer's problem is to find equipment which will withstand both corrosion and abrasion and at the same time aid him in producing his product economically and in a high state of purity.

In America, salt is often produced by the grainer process, but in England open pan, vacuum pan or evaporator are the more general means of manufacture. The process produces salt which has a fairly coarse grain. Purified brine is led into long troughs and maintained at a constant height by a float system. Steam pipes in the trough evaporate the brine



A Monel metal chute carrying warm brine at the works of Cerebos Ltd., Greatham. The mesh basket is also made of the same metal; both are in perfect condition after four years' service.

and salt crystals are formed which fall to the bottom of each trough. These are collected by an automatic feathering rake which passes them to a drain-board at one end. To prevent rust contamination and to resist corrosion Monel metal is used for the drain-boards. The wet salt is conveyed by Monel metal machinery from the drain-boards to the warehouse for storing.

Salt vacuum pans are usually of cast iron, shaped like two cones set base to base on a short cylindrical section. This cylinder contains vertical copper tubes or flues open at both ends. Brine from the settling tanks flows into the lower cone and cylinder filling the tubes and covering their upper ends to a depth of about a foot. Steam from a central boiler plant circulates and condenses round the tubes, an air pump reducing the pressure in the upper cone by extracting air. This soon lowers the boiling point of the brine to less than the temperature of steam and rapid ebullition takes place. Even cubes of salt crystallise out and settle to the bottom of the lower cone.

The vapours from the first pan are led into the cylinder of the second pan and there a similar process takes place. This may be continued three or four times until a stage is reached where a continuance of the process is no longer economical. The salt is removed from the pans by bucket elevators and in many cases Monel metal screen is used in these buckets owing to its resistance to abrasion and corrosion. Alternatively, the salt may be removed by chutes which carry the wet salt on to the next stage in preparation for drying.

The dryers are steam-heated cylinders which revolve while the salt slowly passes through. Various materials have been used for lining dryers including maple staves. The wood, however, has a tendency to split and is quickly worn away by abrasion. Steel is unsuitable because of the corrosive action of salt, and brasses and bronzes soon wear out. The use of Monel metal for the lining, flights and rivets has proved to be the best solution for these problems. An independent survey made for a large salt manufacturer indicated that Monel metal had effected a reduction of 54 per cent. on the actual cost of dryer linings.

The salt from the dryer is passed through screens for grading and Monel metal wire cloth is frequently employed for this purpose. The ability of this metal to resist the corrosive action of salt brines and the abrasive action of salt crystals has led to it being used for chutes, conveying machinery, elevator buckets, evaporator tubes, hoppers, linings, flights of rotary dryers, pump rods, screens, tie rods, and weighing and packaging machinery. It has been adopted for valve stems, pump flanges and working parts of hydraulic presses used in the manufacture of salt blocks. It is used in pumps handling saturated brine because it does not pit and because it effects a material saving in the gland packing.

Apart from its durability which is of great service to the plant engineer, Monel metal is of perhaps the greatest value to the salt industry in that it prevents discoloration and contamination of the product. The purity of salt depends largely upon the materials with which the grains come in contact during the processes that intervene between crystallisation and the final packing.

IMPORTANT developments are foreshadowed in the Hungarian petroleum industry. A new well in the Lispe-Szentadorján oilfield is showing a daily yield of 250 tons, making a total daily production of 300 tons or nearly one-half of the Hungarian consumption. A large-scale cracking plant is to be built by the Hungarian Hydrobenzine Co.

Investigations in Industrial and Engineering Chemistry

Papers Read at This Week's Meeting of the American Chemical Society

ADVANCES in chemistry ranging from greater industrial utilisation of agricultural products in the United States to Europe's motor fuel needs were reported in nearly 500 papers and addresses at the 96th meeting of the American Chemical Society, at Milwaukee, September 5 to 9.

The $1,000 American Chemical Society award in pure chemistry was presented to Dr. Paul D. Bartlett, assistant professor at Harvard University, for "notable research in the important borderline field between organic and physical chemistry." The funds for the prize, in previous years provided by A. C. and Irving Langmuir, were this year donated by Professor James E. Kendall, of Edinburgh University, a former member of the faculties of Columbia and New York Universities.

Dr. Frank C. Whitmore, of Pennsylvania State College, president of the American Chemical Society, delivered an address on "Looking Backward and Forward in American Chemistry." The Priestley gold medal, highest honour of the Society awarded every three years, was bestowed upon Dr. Marston Taylor Bogert, professor of organic chemistry at Columbia University and a past president of the Society. The subject of Dr. Bogert's medal address was "From the Cradle to the Grave."

Fifteen symposia dealt with vitamins, the physical chemistry of the proteins, plastics, coatings, the nomenclature and chemistry of sugars, recent advances in methods for the determination of traces, nuclear chemistry, liquid ammonia solutions, American patent practice and procedure, unit processes, surface-active agents, the place of science in general education, electrical insulating materials, and the industrial utilisation of agricultural products.

The following are abstracts of some of the papers read:—

Heat Transfer in an Evaporator

Heat Transmission in Relative Tubes in a Vertical Tube Evaporator. H. B. Riffenburg.

Studies were made on a laboratory evaporator to determine the relative heat transfer in the different tubes under variable steam pressure and velocity. Data on four tubes, one located directly in the path of the entering steam, one located on the opposite side of the steam chest, and one on each side 45° from the steam entrance, were selected. Water was circulated through these tubes at a sufficient rate to prevent boiling. By measuring the temperature and amount of the circulating water, data were collected which showed a remarkably close agreement in heat transfer in the tubes tested under low steam velocities. However, when the steam velocity reached about 6 ft. per second as it left the 1.5 in. pipe that fed steam to the calendria, the tubes adjacent to the steam entrance showed a lower heat transfer than the other tubes; and the tubes directly opposite showed a higher heat transfer than the others. The highest difference noted was 20.5 per cent. which indicates that the steam velocity appreciably affects the steam film.

Absorption of Gases by Liquid Droplets. The Design of Simple Spray Scrubbers. H. F. Johnstone and G. C. Williams.

Measurements on the rates of absorption of several gases by falling drops of various sizes and at different gas velocities are reported. The results confirm the theoretical equations of Johnstone and Kleinschmidt (*Trans. Am. Inst. Chem. Eng.*, 1938, *34*, 181). On the basis of the size distribution of droplets from a commercial spray nozzle and the integrated equations of motion, the volume absorption coefficients are calculated for a simple countercurrent scrubber. With nozzles properly designed and operated, relatively high coefficients may be obtained which actually increase with distance from the nozzle. The equations may be applied to the design of spray humidifiers.

Factory Floors in the Chemical and Related Industries. Reuel C. Stratton and Warren A. Hough.

Floor problems in the chemical industries differ from those in manufacturing as a whole, due to attacking factors such as acids, alkalies, oils, moisture, etc. Care in selection of a flooring material is therefore unusually important if good service is to be obtained. Five general types of flooring are discussed, namely, earth, wood, metal, composition, and stone or ceramic. Earth and wood planks are judged unacceptable in most chemical exposures. Metal and stone or ceramic are harsh and often unsafe. Creosoted wood blocks have many good applications. They are resistant to many chemical materials, oils being the most notable exceptions. Among the composition floors, the most important are concrete, asphalt, and magnesite. These materials are discussed at some length and some of the fine points of laying this type of floor are explained. It is concluded that concrete should be regarded as a foundation material rather than a surface. Asphalt, both mastic and tile, is regarded as a very good surfacing material, being attacked only by oil and solvents to any great extent. Magnesite has apparent possibilities of a high order.

Tin as Packing Material

Use of Tin as a Packing Material Limited by its Allotropic Transformation. A. C. Hanson and G. O. Inman.

Samples of commercial tin were kept at low temperatures, varying from −18° to −45° C., for three days without change. Two months at +5° C. in ammonium stannous chloride solution initiated transformation to gray tin. Samples used in this test were of two types, as cast and rolled into sheets. As the time required for transformation to take place in a chilled sample was desired, additional samples were made up, three of commercial tin and three of Bureau of Standards 42B tin. These were kept at −10° C. for one year. When examined, a few spots of gray tin were found. To prove conclusively that this was gray tin, three samples of each, commercial and Bureau of Standards 42B tin, were cleaned thoroughly, inoculated with the gray tin from the previous samples, sealed individually in glass tubes, and chilled to −10° C. for four months, then placed outdoors during six winter months. Transformation had taken place on all samples when examined at the end of ten months and in some cases, had completely penetrated the 0.008 in. sheet in this time. Tests for bismuth, both colorimetrically and spectrographically, proved its absence. It is concluded that, due to the short time required for transformation, especially after inoculation, pure tin should not be used as a packing substance in ordnance material.

Vapour Phase Catalytic Oxidation of Organic Compounds. Production of Toluic Aldehyde and Phthalic Anhydride from Xylene. W. George Parks and Chauncey E. Allard.

The vapour phase catalytic oxidation of organic compounds has become of great industrial importance in the production of partially oxygenated derivatives. The direct catalytic oxidation of xylene to produce toluic aldehyde and phthalic anhydride has been investigated employing catalysts which varied greatly in chemical nature as well as physical structure.. Compounds of molybdenum, vanadium, iron, chromium, tin, zirconium, magnesium, potassium, tungsten, titanium, and aluminium were used singly and in various combinations. They were used either in granular form or on a support of porous aluminium, activated alumina, asbestos fibre, silica gel, pumice, or alfrax. Results on fifteen catalysts

which showed an appreciable effect are reported. Using a tin vanadate catalyst at 320° C. with a time of contact of 0.002 second and an air-xylene ratio of 13.4 a yield of 8 per cent. phthalic anhydride was obtained. With a vanadium pentoxide catalyst supported on alfrax at a temperature of 530° C., an air-xylene ratio of 34, 18 per cent. phthalic anhydride was obtained. This catalyst gave yields varying from 45 per cent. to 85 per cent. phthalic anhydride on the basis of the amount of xylene oxidised per pass.

Oxidation of Phosphorus to a Pentavalent Form by Carbon Dioxide. Equilibria in the Phosphorus-Carbon-Oxygen System. P. H. Emmett and J. F Schultz.

In the temperature range 800° to 1,200° C. a gaseous mixture of P_4-CO_2 containing more than 11.1 per cent. phosphorus vapour quickly reaches an equilibrium corresponding to the conversion of about 80 per cent. of the CO_2 to CO. If less than 11.1 per cent. phosphorus is present, practically all elementary phosphorus is absent at equilibrium in this temperature range, a mixture of phosphorus pentoxide and phosphorus tetroxide being obtained. The equilibrium in the carbon monoxide-carbon dioxide-phosphorus pentoxide-phosphorus tetroxide system is such that with equal molal quantities of the pentoxide and tetroxide present the ratio of CO to CO_2 is about 1 to 2. In the presence of phosphate rock the oxidation of phosphorus by carbon dioxide to the pentavalent form in the above temperature range is complete, the product formed being calcium metaphosphate.

SYMPOSIUM ON UNIT PROCESSES

Design and Development as Correlation Courses for Instruction in Unit Processes and Unit Operations. Frank C. Vilbrandt.

The rapid advancement in chemical engineering practice and education has led to specialisation in instruction in chemical engineering, even in the fundamental chemical and physical concepts. Industry's demand for trained men with correlated concepts might possibly be satisfied by a revision of the old industrial chemistry course where laboratory instruction has been provided. After the teaching of the fundamentals of chemistry through physical, mathematics through calculus, chemical engineering through the fundamentals, including laboratory instruction, industrial chemistry through a portion of stoichiometry, *i.e.*, beginning with the winter quarter of the senior year, a course of instruction might be given involving individual or small group assignments which includes development laboratory, literature search, conference instruction, design of process and plant layout, and comprehensive report writing including the economic phases of chemical production.

Unit Processes—Ethylation and Hydroxylation. Harry McCormack and G. J. Stockman.

An improved process was described leading up to the manufacture of phenetole. The consideration of this process arose from the desire to use the nitration product, para-nitrochlorbenzole, reported on in a previous paper. The reaction of ethylating and hydroxylating paranitrophenol has been practiced, using alkali as the condensing agent, conducting the reaction under pressure and in an oxidising atmosphere. A study of the reaction characteristics leads to the conclusion that it is essential to maintain the hydrogen-ion concentration within rather narrow limits while the reaction is occurring. This was accomplished by adding sodium metasilicate to the customary reacting materials. A comparison of this process with those previously disclosed indicates that the reaction period is shortened by at least 70 per cent., that it is continous rather than discontinuous, considerable oxygen is saved, and a product of high purity is secured.

Mono-Nitration of Para-Cymene. Kenneth A. Kobe.

Para-cymene has been successfully nitrated with yields of over 90 per cent. of mono-nitrated products consisting of 2-nitro-*p*-cymene and *p*-nitrotoluene, the latter about 8 per cent. The particular features of this process are : (1) the maintenance of a good emulsion throughout the nitration, enabling the utilisation of all the *p*-cymene with a minimum of oxidation at −10° C., and (2) a very decreased nitration time due to effective means of heat removal by means of dry ice in alcohol for the cooling bath. To an emulsion consisting of 500 grams of technical *p*-cymene, b.p. 174° −8° C., 1,000 grams of H_2SO_4 (d 1 84) and 300 ml. of glacial acetic acid is added at −10° C. a mixture of 369 grams of HNO_3 (d 1.42) and 1,000 grams of H_2SO_4 (d 1.84) with the cooling bath at −30° to −35°. In spite of the extreme exothermic nature of the reaction, the total nitration time is only two hours. A technical *p*-cymene, obtained from sulphite turpentine has been used which possesses certain emulsifying properties which make it more advantageous than pure *p*-cymene, besides being far more economical. Pure *p*-cymene may be successfully nitrated provided an appropriate emulsifying agent is added. Oxidation products are formed along with the nitration products in the absence of the emulsion. The importance of a good emulsion and temperature control are stressed for the nitration of other easily oxidised compounds.

Reduction of 2-Nitro-p-Cymene. Kenneth A. Kobe.

Separation of the mixture of 2-nitro-*p*-cymene and *p*-nitrotoluene formed in the mono-nitration of *p*-cymene by fractionation is difficult. The corresponding amines are far more easily separated, but the complete reduction of the mixture by standard laboratory methods is not easily carried out. Pure 2-nitro-*p*-cymene is easily reduced. To effect complete reduction a laboratory shaker equipped with a heater, flask, and condenser with provision for slowly adding hydrochloric acid to the mixture of nitro compounds, iron powder, and sand has been found very convenient. This apparatus is useful for carrying out numerous heterogeneous reactions.

Equilibria, Reaction Rates and Yields in Unit Processes. Raymond H. Ewell.

Yields in chemical reactions are determined by two factors : the equilibrium state and the rates of all the reactions concerned. Thermodynamics is able to state definitely what will be the final equilibrium state, but it can say nothing about the rate of attaining equilibrium. The knowledge of reaction rates and catalysis attempts to supply the answer to this question. The thermodynamics of some industrially important unit processes were discussed, including halogenation, hydration, hydrogenation, nitration, and isomerisation.

SYMPOSIUM ON SURFACE ACTIVE AGENTS

Importance of Surface and Interfacial Tension Measurements in Industry. E. A. Hauser, J. M. Andreas, and W. B. Tucker.

Boundary tension at an interface between a liquid and a gas or vapour (surface tension) or at the boundary between two incompletely miscible liquids (interfacial tension) is a measure of the free energy of a fluid interface. Therefore it is a predominant property of liquid surfaces. Our increasing scientific knowledge of molecular orientation in phase boundaries and their bearing on a great number of industrial, biological, and other processes and developments, like ore flotation, emulsification, spumification, wetting and impregnation, laundering, pigment dispersion, etc., as well as the constant discovery of new detergents, makes an accurate study of boundary tensions more and more imperative. The importance of studying possible changes in boundary tension of a system with time and concentration of solute (positive or negative adsorption) was pointed out, with special reference to the efficiency and economy of the detergent.

Application of the Film Balance to the Surface of Ordinary Solutions. J. W. McBain and L. H. Perry.

Until recently the film balance has been used only for the study of insoluble films on water. There are, however, many ways in which it may be usefully applied to the study of clean surfaces of ordinary solutions free from insoluble material. Many quite unexpected results have been obtained, and it is evident that the surface of an ordinary solution is very

different from the familiar conception of a two-dimensional adsorbed layer lying on unchanged solution. Some liquids, like water, exhibit no effect upon the movable float when the surface is expanded or contracted, swept, or compressed. This is true also of many solutions whose surface tension is well below or above that of water. In such cases surface tension does not affect the film balance at all. In another group of solutions, the float may be shifted by sweeping or compression, but the effect almost at once disappears. In other cases the result depends upon the concentration, only dilute solutions giving an observable effect. In a third group of solutions marked effects of some complexity are produced. In many cases the most striking novel effect obtained is that upon ageing the surface develops a pellicle which can produce appreciable surface pressures upon sufficient compression of the surface. Nevertheless, the two-dimensional adsorbed pellicle requires a definite minimum pressure for dissolving. The surface tension is therefore not reversibly obtained from both sides, but a false equilibrium may be produced. The same pressures are produced by sprinkling solute on water.

Surface Activity of Solid Emulsifiers. J. Mitchell Fain and Foster Dee Snell.

Finely divided solids, acting as emulsifiers, appear in the interface between the two emulsion liquids and their distribution may be determined from a consideration of their contact angles. The aqueous dispersion of asphalt with the aid of bentonite is a large-scale industrial application of finely divided solids as emulsifiers. Its study throws light on their fundamental properties. The increase in hydrogen-ion concentration of a bentonite slip by addition of sulphuric acid results in increase in viscosity. Partial flocculation or coagulation of the emulsifier is found necessary for optimum emulsification. The effect of a weak flocculating agent is to counteract the peptisation of the solid suspension and to force the solid into the interface. The juxtaposition of the bentonite granules, situated as they are in a thin layer around the already emulsified asphalt particles, causes them to serve as a cutting edge for the subdivision of new asphalt fed into the emulsion. The addition of citric acid in small amounts to an emulsion of asphalt in water, with bentonite as emulsifier, substantially decreases the time required for plastic flow. The addition of citric acid to the bentonite slip causes a reduction in viscosity up to a certain point, after which the viscosity increases with increase in the amount of citric acid added. The addition of oxalic acid produces a similar effect on the viscosity of the bentonite slip.

Hexametaphosphate in Soluble Complex Formation

Surface-Active Properties of Sodium Hexametaphosphate. G. B. Hatch and Owen Rice.

Besides possessing definite surface-active properties of its own, hexametaphosphate has the ability of forming soluble complexes with many multi-valent cations, thereby reducing their concentration to such an extent as to practically eliminate their agglomerating action on numerous colloid systems. Examples of these properties are found in its action as a peptising agent, as a depresser in selective flotation, and in its effect upon mono-layers. Recently, amounts of hexametaphosphate very much below those required for complete calcium sequestration have been found very effective in preventing calcium carbonate deposition upon moderate treatment of bicarbonate waters with heat or alkali. Thus the addition of 2 p.p.m. of hexametaphosphate to a water containing 200 p.p.m. of $Ca(HCO_3)_2$ will obviate precipitation when the water is treated with 500 p.p.m. of Na_2CO_3 or is heated to 80° C. for one hour. This " threshold treatment " with amounts of hexametaphosphate of the order of 1 to 5 p.p.m. has proved very useful in the prevention and removal of carbonate scale in many industrial processes.

Effect of Surface-Active Agents in Dyeing. J. Edward Smith.

The effect of surface-active agents on the dispersion of dyes in the dyeing of cotton and in their removal from cotton has been studied. The addition of technical lauryl sodium sulphate has very little effect on the degree of dispersion of benzopurpurine 4B in solution as judged by diffusion methods. Additions of technical lauryl sodium sulphate, a typical alkyl naphthalene sodium sulphonate, and sodium oleate to the dyebath have very little effect on the rate of dyeing, although they promote a more uniform distribution of colour on the surface of cotton. Wash tests with a number of dyes on cotton show that the removal of dye is only slightly increased by solutions containing sodium oleate or technical lauryl sodium sulphate compared with water alone; technical cetyl pyridinium bromide as a detergent decreases the removal of dye markedly. Surface-active ions tend to precipitate colour ions of opposite charge. There is little evidence to show that negatively charged surface-active ions disperse soluble dyes in solution or on cotton. Negatively charged surface-active ions assist in the uniform distribution of colour on cotton during dyeing by their action as wetting agents rather than as dispersing agents for dyes.

SYMPOSIUM ON ELECTRICAL INSULATING MATERIAL

Liquid Dielectrics. Some Chemical, Physical, and Electrical Properties of Systems containing Lead or Copper Soaps in Liquid Paraffin. John D. Piper, A. G. Fleiger, C. C. Smith, and N. A. Kerstein.

As part of a study designed to determine which of the types of products that may be formed by the service degradation of insulating oils cause serious dielectric losses in insulating oils at 60 cycles and those which do not, numerous copper and lead soaps have been prepared and the properties of mixtures of these soaps in liquid paraffin have been investigated. Most of the lead soaps dissolved readily at about 120° C. to form clear sols. The power factors of these sols became very high as they were cooled nearly to the temperatures at which they became visibly heterogeneous. Below these temperatures, the power factors dropped sharply. The simple cupric soaps were much more soluble than the lead soaps. Several per cent. by weight of these soaps could be added to liquid paraffin before the power factors of the mixtures rose above 0.003 to 80° C. Upon cooling, most of these mixtures became visibly heterogeneous, but, unlike the mixtures containing lead soaps, did not have high power factors near the transition temperatures. Mixtures containing cupric abietate to which acetic or cyclohexanecarboxylic acids were added were similar in dielectric behaviour to those containing lead soaps though the former did not become visibly heterogeneous.

Critical Study of some Tests used in the Investigation of Insulating Oil Deterioration. J. C. Balsbaugh and J. L. Oncley.

A previous investigation concerned the deterioration, usually by oxidation, of electrical insulating oils upon the study and improvement of existing tests. These tests may be grouped into three classes: chemical, electrical, and physical. They involve: (1) the determination of (a) hydrocarbon type, (b) oxygenated components, both volatile and non-volatile, (c) metallic components, and (d) other components (e.g., sulphur and nitrogen); (2) the measurement of (a) direct current conductivity, and (b, c) power factor and dielectric constant over the audio-frequency range; and (3) the measurement of (a) light adsorption over the visible frequency range, (b) viscosity, and (c) state of subdivision in the case of colloidal components.

Cellulosic Insulation Treated with Mineral Oil

Chemical Factors Influencing the Stability of Mineral Oil-Treated Insulation. F. M. Clark.

To evaluate properly the suitability of mineral oil-treated cellulosic insulation for high voltage application, consideration must be given (a) to the chemical characteristics of the impregnating oil, including the oxidation formed products, and (b) to those properties of the oil which reduce the possibility of void formation with disastrous ionisation effects. The present paper considered the problem relating to chemical and electrical changes produced in the composite insulation in the

absence of electrical discharge. The dielectric stability of the oil-treated cellulosic insulation in the absence of electrical discharge is best determined by an examination of the power factor of the treated paper as affected by a voltage life test run under oxidising conditions. In no instance should the unsaturated olefinic constituents of the oil exceed 5 per cent. of the total oil volume. Larger amounts in the oil are accompanied by a highly unstable treated paper power factor. In like manner the refining operation for the Gulf coastal oil must be so selected that the aromatic type of unsaturation is held within definite limits. Some aromatic unsaturation is desirable and necessary but an excess leads to increased electrical instability in the oil-treated dielectric. The optimum amount has been found to be approximately from 4 to 8 per cent. Saturated paraffinic hydrocarbons are in general unsuited for use as impregnants for high-voltage cellulosic insulation. The addition of synthetic aromatic (benzenoid) hydrocarbons to mineral impregnating oil, advantageous though such additions may be from the standpoint of ionisation effects, must be carefully considered if the highest degree of dielectric stability is to be maintained in the impregnated insulation. The addition of aromatic paraffinic side-chain hydrocarbons to mineral oil of the type discussed is accompanied by increased electrical instability in the oil-treated dielectric.

The Electrical Application of Polystyrene. L. A. Matheson and W. C. Goggin.

Polystyrene, formed by the thermal polymerisation of monomeric styrene, $C_6H_5CF=CH_2$, has been known for many years to be an excellent dielectric solid. It possesses outstandingly low electrical power factor, high dielectric strength, great arcing resistance, and low water absorption. The material has recently become available in America at a price which will promote much more extensive application. Mention was made of the methods of applying styrene in the electrical field as the monomer and as the polymer in the cast, moulded, and solution forms.

Atmospheric Pollution, with Special Reference to Sulphur and Grit*

By

BIRKETT WYLAM, Ph.D., M.Sc., M.I.Chem.E., F.I.C.

Of the 176 million tons of coal consumed per annum in the United Kingdom, the equivalent of some 160 million tons is burned without removal of sulphur, and, taking a figure of 1.5 per cent. as the average sulphur content of the coal, about 2.4 million tons of sulphur per annum are burned long with our coal consumption. Assuming that 17 per cent. of the sulphur content of the coal remains in the ash, then two million tons of sulphur are burned to sulphur dioxide every year. This sulphur dioxide is potentially capable of producing, under the influence of atmospheric oxygen and water vapour, six million tons of sulphuric acid. When it is stated that the commercial production of sulphuric acid in the United Kingdom during 1937 was just over one million tons, the extent of the pollution of the atmosphere by sulphur gases arising from coal burning will be realised and the immensity of the problem of sulphur elimination appreciated. In addition to the discharge of sulphur gases during coal burning, there is also the emission of smoke and grit.

Sulphur Dioxide

The matter of sulphur oxide emission from smelters was the subject of exhaustive inquiry by a commission in California, whose report is extremely informative and interesting. (U.S. Bureau of Mines Bulletin, *98*, 1915.) Where there exists an outlet for sulphites and bisulphites the problem presents no great difficulty, but such is not always the case. In 1922 practically all the sulphur dioxide produced by the roasting of zinc ores in this country was discharged to atmosphere. The gas is now converted, by means of contact plant, into sulphuric acid, and 95 per cent. of the sulphur is recovered.

On the Continent, the Petersen system of sulphuric acid manufacture has been adopted for making full use of the sulphur dioxide contained in smelter gases. There are, however, no examples of this plant in Great Britain.

Some recent experiments have been directed towards the possibility of absorbing the sulphur dioxide in a suitable solvent, such as sodium citrate, and then releasing it in concentrated form, at the same time regenerating the solvent solution for further use. (B.P. 400,998.)

Sulphur oxides, evolved during the calcination of copperas, may be treated by thorough cooling and washing with water (to remove sulphur trioxide), followed by passage through a tower in which are a series of grids supporting lump limestone and over which water is allowed to flow. The sulphur dioxide reacts with the limestone and the resultant calcium sulphite is washed away (to waste) by the water, thus constantly exposing a fresh surface to the action of the gas.

Another method of treatment makes use of the sulphur oxides to produce some of the copperas required in the process. In this case the gases, which consist chiefly of a mixture of sulphur dioxide and trioxide with air and water vapour, are condensed by the "wet" method. Briefly, the gases from the furnaces are passed through fused silica pipelines into a stone tower and thence into a pitch pine tower; both towers are filled with scrap iron and irrigated by a stream of water (eventually weak copperas liquor) which meets the hot gases in its descent of the first (stone) tower, and, passing down the second tower along with the gas, effects almost complete absorption.

Visible smoke emission has been the subject of public outcry ever since the possibilities of raw coal as a fuel were realised. More insidious, however, are the invisible acid fumes which accompany it, chiefly as sulphur dioxide. These acid fumes, being soluble in water, are dissolved in rain, and, on precipitation, they cause much material damage.

Of late years, much interest has been displayed in the treatment of fuel gases from electricity power stations on account of the large fuel consumption involved and concentrated in one place. The removal of sulphur dioxide from such flue gases is undoubtedly desirable. Attention was focused on this aspect of atmospheric pollution by the legal action taken against and electricity undertaking near Manchester some years ago, and, more recently, by the restrictions imposed on the London Power Company's installation at Battersea and the Fulham Corporation's station.

Removal of Sulphur Dioxide at Battersea

At Battersea the flue gases pass from the induced draught fans to primary chambers, where they are first water-sprayed in contact with iron channels. They then pass into the main flue connecting the two chimneys, where contact is made with similar water-sprayed channels. Arriving at the towers beneath the chimneys, the gases are subjected to further water-spraying. The sulphur dioxide is converted to sulphuric acid by the catalytic action of the iron oxide on the surface of the channels, and this acid is neutralised by the natural alkalinity of the Thames water employed. The gases

* Abstract of paper presented yesterday at the Annual Conference of the Sanitary Inspector's Association at Edinburgh.

subsequently ascend the two-side uptakes of the tower, where they make contact with wooden scrubbers and receive an alkaline wash, finally passing through moisture eliminators to the chimneys.

The Howden-I.C.I. Scrubber

At Fulham the Howden-I.C.I. scrubber is utilised. This system, which has been developed at Billingham, consists essentially of a series of towers in which the flue gases are washed with water containing a cheap alkali to neutralise the absorbed acid. The scrubber towers are packed with grids and the wash liquor is maintained at the requisite pH by continuous addition of alkali in a thin slurry to the effluent from the towers, whilst a small quantity of the effluent is continually bled away to a settler where the solids are removed. By this means, solids in the circulating water are maintained at a concentration of from 10 to 15 per cent. by weight. In order to avoid scaling on the packing, a delay tank is incorporated in the system which permits time for the weak liquor to become desupersaturated of calcium salts. The clarified water from the settler may be returned to the system and thus there is no liquid effluent for disposal.

In connection with plant for the removal of sulphur oxides from waste gases, it has been necessary to establish means of estimating small concentrations of sulphur dioxide (less than 0.01 grain per cu. ft.) so as to determine the efficiency of the plant. In addition to such tests, it is often desirable to instal a means for the continuous determination and recording of the sulphur oxide concentration. An apparatus for this purpose has been developed by Fox and Groves, of the Government Laboratory, and this is now made in suitable forms by the Cambridge Instrument Company. Another type has been designed by Rees and Richardson, of the London Power Company. (B.P. 404,600.) The latter apparatus, which is in use at the Battersea Station, depends on the absorption of sulphur dioxide in hydrogen peroxide and its precipitation as barium sulphate. The opacity of a standard length of the suspension is measured by a light sensitive cell, and this can be translated into sulphur content.

Grit and Dust

As regards solid particles, this problem arises in connection with cement works and installations employing pulverised fuel, and, to a lesser extent, in many other industries, but in most of the latter either the particles are relatively heavy and can be easily arrested or the volume of gas, in which they are suspended, is small so that bag filtration can be used.

Arresters, which are based on the principle of centrifugal action, are suitable for removal of grit from ordinary hand or stoker fired furnaces and can efficiently remove particles of size greater than 20 microns diameter. The arrestment of particles smaller than this requires the installation of more elaborate plant, such as electrostatic precipitation or wet washing.

Electrostatic precipitation is effected by causing the dust-laden gas to pass through an electric field between a high potential and an earthed element. The suspended particles, in their journey through the electric field, become charged and are attracted to the earthed element on which they impinge. Coalescing into particles of larger size, the precipitated dust is disengaged by a periodic rapping of the tubes or plates and falls into hoppers, whence it can be withdrawn as desired. Electrostatic precipitation plants work very efficiently. No dry system, however, affords a means of removing sulphur oxides simultaneously such as is offered by wet washing systems. Among the forms of wet washing that have been devised and used for removal of dust is the Modave system. This consists of a series of tubes of special design, placed vertically in a chamber. The tubes are so disposed that the gas passing through the chamber is constantly baffled by them. Water from a distributor placed over the chamber runs into the tubes and overflows therefrom in a film over the outer surfaces. The dust-laden gases are made to pass through the chamber in a direction at right angles to the length of the tubes. The dust impinges on the wetted surfaces of the tubes and is washed off. A large flow of water is required for the efficient operation of this plant.

The plant developed by Howden-I.C.I., Ltd., is designed also for the removal of dust and an efficiency of 98 per cent. is claimed for it.

In connection with cement works, the problem is also acute. A number of methods have been tried with the object of trapping the dust within the kiln itself. Chief among such is the use of a system of chains suspended in the mouth of the kiln. The chains, wetted by the ingoing slurry, not only are effective in dedusting the gas, but also conserve some of the sensible heat which would otherwise be carried away in the waste gases.

Cyclones and mechanical devices are only partially successful. Usually the amount of dust left in the gas is still sufficient to occasion some complaint.

Electrostatic precipitation is now practised at many cement works. Although there have been initial difficulties, these have been largely overcome and the process is working satisfactorily in many plants.

Removal of Sulphuric Acid Mist

The removal of liquid particles such as tar fog and sulphuric acid mist from waste gases can also be dealt with very efficiently by means of electrostatic precipitation.

Alternatively, an apparatus known as the Calder-Fox scrubber is much used for removal of sulphuric acid mist, particularly from the waste gases arising from the concentration of acid. In this apparatus the gases are made to pass at a high speed through a series of perforated plates, the perforations being so disposed that the gases must, of necessity, constantly change direction. Properly used, the scrubber is extremely efficient and results in condensation of a very pure acid.

Another interesting development for the arrestment of dust and fumes from industrial plant is the Traughber Froth-Flotation Process. Here the gases to be treated are passed through an aqueous mist and subsequently through a froth. The mist is produced within the washer by a smooth cylinder, rotating at high speed, just touching the surface of the washing liquid whilst froth is formed by allowing the gases to bubble, in finely divided streams, through a shallow layer of washing liquid upon the surface of which a few drops of special oil of low surface tension are allowed to fall at predetermined intervals. An adjustable overflow, through which the froth returns to the washing liquid, carrying entrapped impurities with it, regulates the thickness of the layer of froth, which is constantly renewed by recirculation.

Wet-Washing Processes

For the dedusting of large volumes of industrial gases, such as blast furnace gas, electrostatic precipitation has found much application, but wet washing by such processes as the Whessoe or dry filtration as in the Yuille method are being used. In the Whessoe Washer the gas is first subjected to counter-current water scrubbing in a packed tower where the bulk of the coarse dust is removed. It is then passed through fan washers or "disintegrators"; these are essentially wet fans and provide the necessary suction to move the gas. Water is fed to the top of the casing and is disintegrated by the blades which bring the water into intimate contact with the gas, thoroughly wetting the dust and carrying it away with the water stream. Finally, the gas is passed through mist arresters before being used or discharged.

The Yuille Filter adopts a double filter bed of metal wool separated by an air space; the metal is in the form of very fine ribbon with serrated surfaces or an irregular section. Between the two filter beds there is a series of revolving baffles which prevent the dust from the upper mattress falling upon the lower one. The mattresses are vibrated at intervals to shake out the dust which is collected in a hopper at the bottom of the plant.

The "Chemical Age" Lawn Tennis Tournament

Finals at Alderbrook Park—Holders Retain Doubles Challenge Cup

THE finals of the eighth annual CHEMICAL AGE Lawn Tennis Tournament were held on Saturday afternoon at Alderbrook Park, near Guildford, at the kind invitation of Mr. Albert Van den Bergh (chairman of Van den Berghs and Jurgens, Ltd., and joint vice-chairman of Lever Brothers and Unilever, Ltd.) and Mrs. Van den Bergh. In spite of a weather forecast of "unsettled," it turned out to be a simply perfect day with a brilliant sun shining almost constantly throughout the afternoon. The house stands high and on such a day the distant views of the surrounding country were seen to perfection. The beautiful grounds were looking their very best and the guests took every available opportunity during the afternoon of walking round the lawns and rose garden; some really magnificent trees were especially admired.

It was a most enjoyable day—owing to the thoughtful arrangements made by Mr. and Mrs. Van den Bergh and Mr. James Van den Bergh. We are extremely grateful to them for the great trouble which they took in planning for the comfort of the guests down to the smallest detail; it was to them that the unqualified success of the afternoon was due.

Mr. Albert Van den Bergh.

Play began with the finals of the men's doubles. Mr. G. W. Hole, of the Anglo-Saxon Petroleum Co., Ltd., and Mr. C. G. Smith, of Shell-Mex and B.P., Ltd., won THE CHEMICAL AGE doubles challenge cup by beating Mr. R. J. Sleap, of the United Yeast Co., Ltd., and Mr. F. Darton, of J. Buchanan and Co., Ltd, by three sets to love (6-0, 6-3, 6-3). Hole and Smith started off at a whirlwind pace, winning the first set without losing a game. They only dropped three points in the first three games, their superiority in service being most marked, neither losing a point in their respective service games. Their opponents did better in the three remaining games of the set, two of which were taken to deuce. In the second set, Sleap and Darton began to settle down to the strange court. They won the first game quite easily off Hole's service, and although losing the second after a long struggle they took the third and fourth to lead by 3-1. Hole and his partner, however, rallied very strongly and, winning the next five games for the loss of only six points altogether, took the set at 6-3.

The final set started similarly, with Sleap and Darton on top at the beginning. They led by two games to love, but here their opponents made another spurt to win the next four games in succession. Sleap and Darton then made their final effort, producing some of the best tennis in this match. With Sleap serving they won the seventh game, making the score 4-3 in Hole and Smith's favour. The next game, the decisive one in the match, was a ding-dong affair which went to four deuces before Hole and Smith finally won it. The next game, which proved to be the last in the match, they won with ease.

Throughout the match Hole and Smith were a very sound combination and were obviously thoroughly used to each other's play. Their placing of the ball was highly accurate, Smith's lobbing being particularly successful. Sleap and Darton on the whole did not combine so well as their opponents; and were frequently beaten by being out of position. But at the times when they did appear to get well together, play was very even, with little to chose between the two pairs.

After the doubles match, players and guests were entertained to tea by Mr. and Mrs. Albert Van den Bergh; it was served in a loggia adjoining one of the terraces.

In the final of the singles, Mr. G. W. Hole beat Mr. R. J. Sleap in three straight sets, 6-1, 7-5, 6-1. Hole very quickly struck his best form at the beginning of the first set and won the first four games with little difficulty. Sleap then got into his stride and some very fine play was seen. But although Sleap won the next game off his own service, his opponent took the next two, and the set, but not without an exciting struggle.

The second set produced what was perhaps the best tennis of the afternoon. For the first four games there was practically nothing to chose between the two players. But with the score standing at two games all, Sleap went ahead winning the next three successive games to lead 5-2. To gain this lead he was forced to fight every inch of the way and he played a first-class game. At the same time, Hole was rather unfortunate with his smashes, constantly hitting the string or landing a few inches behind the base line. In the eighth game, however, he again found his length to very good effect, and kept it to win the next five games and the set at 7-5. In these games he brought off some perfect cross-court drives and smashes; his play was so masterful that although Sleap led 5-2 he was never allowed to reach a single set point during the ensuing five games.

The final set opened at a very hot pace, all the first four games going to deuce with Hole leading 3-1. The fifth game was the turning point of the match. Sleap made a great effort and went to forty love off his opponent's service. But in spite of this lead he was just unable to take the game. Hole therefore led 4-1 and had little difficulty in winning the next two games to go out at 6-1. On the whole the match was a much more even affair than the bare scores would indicate; if Sleap had managed to pull off the fifth game in the third set it would not have been so easy to say who would have been the eventual winner. The play was of very high standard, especially considering that both competitors had already played in the doubles' finals earlier in the after-

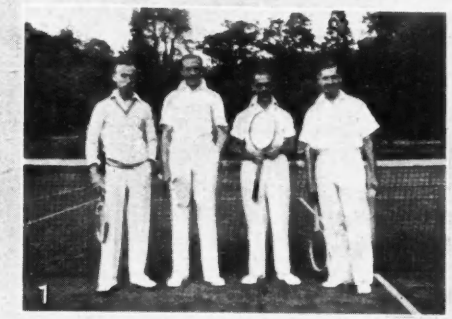
RESULTS

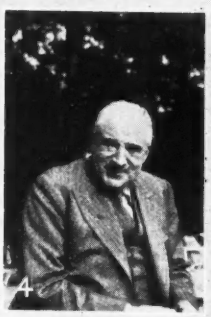
SINGLES :

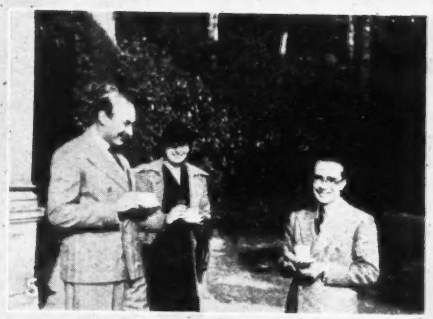
G. W. HOLE (Anglo-Saxon Petroleum Co. Ltd.)
beat
R. J. SLEAP (United Yeast Co. Ltd.)
6-1, 7-5, 6-1

DOUBLES :

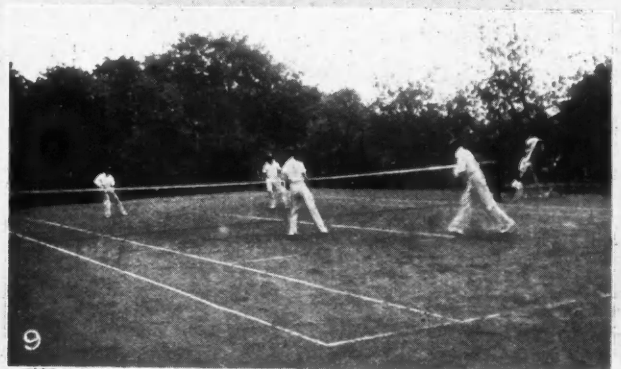
G. W. HOLE and C. G. SMITH (Shell-Mex and B.P. Ltd.)
beat
R. J. SLEAP and F. DARTON (J. Buchanan and Co. Ltd.)
6-0, 6-3, 6-3







1—The Competitors : Messrs. C. G. Smith, G. W. Hole, F. Darton, and R. J. Sleap. 2—The tea interval. 3—Mr. Albert Van den Bergh and Mrs. Glanvill Benn. 4—Mr. W. Lloyd Willey. 5—Mr. and Mrs. Lacy-Hulbert with Mr. James Van den Bergh. 6—Watching the tennis :



Mr. F. Hector Wall, Mr. Albert Van den Bergh, Mrs. James Van den Bergh, Mrs. Glanvill Benn, Mr. James Van den Bergh, and Mrs. Albert Van den Bergh 7—Mr. G. W. Hole serving. 8—Some of the spectators. 9—Play during the doubles match.

noon. Hole's performance of winning both the doubles and the singles challenge cups is a feat never before achieved in the tournament.

The following shows the complete records of the finalists in the 1938 tournament:—

WINNERS.

MR. G. W. HOLE.—1st round, beat Mr. E. T. Hancock (Whiffen and Sons, Ltd.), 6-2, 6-1; 2nd round, beat Mr. R. Porter (Howards and Sons, Ltd.), 6-3, 6-2; 3rd round, beat Mr. E. A. Thomsett (British Oxygen Co., Ltd.), 6-1, 6-4; 4th round, beat Mr. A. W. A. Goudie (Corn Products Co., Ltd.), 3-6, 6-1, 6-1; semi-final round, beat Mr. C. G. Copp (Doulton and Co., Ltd.), 7-5, 6-4, 3-6, 7-5; final, beat Mr. R. J. Sleap (United Yeast Co., Ltd.), 6-1, 7-5, 6-1.

Messrs. G. W. HOLE and C. G. SMITH.—1st round, beat Messrs. R. A. Champkin and A. A. Killick (B. Laporte, Ltd.), 6-1, 6-2; 2nd round, walk over, Messrs. A. E. Triggs and W. Chamberlain (Murex Welding Processes, Ltd.), scratched; 3rd round, beat Messrs. L. F. Grape and A. E. C. Willshere (Borax Consolidated, Ltd.), 7-5, 8-6; semi-final round, beat Messrs. A. F. Eyres and W. Hoppe (Johnson Matthey and Co., Ltd.), 6-3, 6-0, 6-1; final, beat Messrs. R. J. Sleap (United Yeast Co., Ltd.) and F. Darton (J. Buchanan and Co., Ltd.), 6-0, 6-3, 6-3.

RUNNERS-UP.

MR. R. J. SLEAP.—1st round, walk over, Mr. J. I. T. Jones (Mond Nickel Co., Ltd.), scratched; 2nd round, beat Mr. P. E. Hinchcliffe (Borax Consolidated, Ltd.), 6-2, 6-2; 3rd round, beat Mr. W. Hoppe (Johnson Matthey and Co. Ltd.), 6-1, 4-6, 6-1; 4th round, beat Mr. H. G. Wyrill (Ever Ready Co. (Great Britain), Ltd.), 7-5, 6-3; semi-final round, beat Mr. E. Pavitt (Co-operative Wholesale Society, Ltd.), 6-0, 6-3, 6-3; final, lost to Mr. G. W. Hole (Anglo-Saxon Petroleum Co., Ltd.), 1-6, 5-7, 1-6.

MESSRS. R. J. SLEAP and F. DARTON.—1st round, beat Messrs. W. R. Lewis and S. Barnes (British Oxygen Co., Ltd.), 6-3, 2-6, 6-1; 2nd round, beat Messrs. G. Haughton and W. Wakeman (Johnson Matthey and Co., Ltd.), 6-4, 6-3; 3rd round, beat Messrs. A. S. Marcar (Bovril, Ltd.), and F. G. Crosse (Society of Chemical Industry), 6-1, 6-4; semi-final round, beat C. G. Gough and T. P. Williams (Lever Bros., Ltd.), 12-10, 6-3, 6-1; final, lost to Messrs. G. W. Hole (Anglo-Saxon Petroleum Co., Ltd.), and C. G. Smith (Shell-Mex and B.P. Ltd.), 0-6, 3-6, 3-6.

At the end of the second match, MRS. ALBERT VAN DEN BERGH kindly consented to present the prizes. THE CHEMICAL AGE singles and doubles challenge cups and the "Invicta" statuettes, given by Thomas Hill-Jones, Ltd., were presented to the winners, and similar statuettes, given by Mr. W. Lloyd Willey, to the runners-up.

After the presentation, MR. GLANVILL BENN, a director of Benn Brothers, Ltd., proprietors of this journal, thanked Mr. and Mrs. Albert Van den Bergh not only for their kindness in placing the grounds at the disposal of the tournament and in providing such an excellent tea and refreshments, but also for arranging that the weather should leave nothing to be desired! He also thanked Mr. James Van den Bergh for carrying out a large part of the arrangements, and Mr. H. Lewis for kindly umpiring the matches. Mr. Lewis umpired regularly at Wimbledon, but he was sure that the play he had judged during the afternoon was quite up to Wimbledon standard. He was very pleased to see Mr. and Mrs. W. Lloyd Willey; they had taken a keen interest in the competition since it was started eight years ago. Mr. Lloyd Willey had again been kind enough to present the statuettes for the runners-up, and his company, Thomas Hill-Jones, Ltd., similar trophies for the winners.

MR. ALBERT VAN DEN BERGH, in reply, said that he and Mrs. Van den Bergh had been very pleased to make the arrangements for the tournament to be held at Alderbrook Park and he hoped to see everyone again next year. Finally, MR. W. LLOYD WILLEY said that he was only too glad to give the statuettes for the tournament and would be pleased to make the same gift next year.

SPECIALISED COURSES IN ADVANCED CHEMISTRY

The Advisory Committee for Advanced Chemistry to the Yorkshire Council for Further Education has arranged for specialised courses in advanced chemistry to be given at Bradford, Huddersfield and Leeds Technical Colleges, for the 1938-9 sessions. Among those serving on the committee are: H. Burton, D.Sc., F.I.C.; W. A. Wightman, M.A., A.I.C. (Institute of Chemistry, Leeds Area Section); H. H. Hodgson, M.A., Ph.D., B.Sc., F.I.C.; E. H. Goodyear, B.Sc., Ph.D., A.I.C. (Institute of Chemistry, Huddersfield Section); J. A. Craven; H. J. Hodsman, M.B.E., M.Sc., F.I.C. (Society of Chemical Industry, Yorkshire Section); and L. L. Lloyd, Ph.D., F.I.C. (Society of Dyers and Colourists). The courses are primarily for chemists who already possess a University degree, the Associateship of the Institute of Chemistry, or similar qualifications.

At Bradford there will be two series of 25 weekly lectures by F. N. Appleyard, B.Sc., F.I.C., Ph.C., on "The Microscopy of Food and Drugs"; and by J. M. Naftalin, M.B., Ch.B., D.P.H., on "Bio-Chemical Analysis," respectively. In addition there will be a course of twelve lectures on further physical and chemical problems in the textile industry, and one of nine lectures on gas manufacture and utilisation. At Huddersfield, C. B. Jones, A.M.Inst.C.E., F.I.C., will be the lecturer in a course on chemical engineering, and there will also be a course of seven lectures on recent advances in metallurgy. At Leeds a course of ten weekly lectures on synthetic plastics will be given by C. G. Addingley, B.Sc., Ph.D. There will also be a course of lectures on microbiology, including bacteriology.

Details of the courses may be obtained from the Secretary, The Yorkshire Council for Further Education, Education Office, Calveley Street, Leeds, 1.

FIRST INTERNATIONAL FERTILISER CONGRESS

The first International Fertiliser Congress will take place in Rome, from October 3-6 next, on the initiative of the International Federation of Technical Agriculturists, with the co-operation of the National Committee for the Use of Fertilisers. A large number of papers have already been sent to the organising committee of the Congress, while the national and general reports received up to the present amount to more than 220. Drawn up by experts, these reports will form the most comprehensive first-hand documentation that has appeared so far on the manifold aspects of fertiliser production and consumption. The Italian Government has sent official invitations to the various Governments, for the purpose of urging them to appoint a delegation to the Congress.

The subject-matter with which the Congress is to deal is the following: 1st section—raw materials and production of fertilisers; 2nd section—the technique of fertilisation; 3rd section—economical questions; 4th section—propaganda. The Congress is to be followed by two tours, one in the north and the other in the south of Italy. For all details concerning these tours and the travelling facilities granted in the various countries, application should be made to the Agency of the "Compagnia Italiana Turismo" (C.I.T.).

Applications for taking part in the Congress must be addressed on or before September 20 to the Executive Committee of the Congress, Via Regina Elena, 86—Rome.

A.B. EXEL CHRISTIERNSSON, of Stockholm, has put into operation a new factory for the manufacture of lubricating oils with an annual production capacity of 1,000 tons.

Personal Notes

MR. T. G. WILLIAMS has been appointed junior chemist at the Tir John Electricity Power Station, Swansea. At present he is an assistant to Dr. C. A. Seyler, Swansea's public analyst.

DR. WALTER MEREDITH ASHTON, senior analytical chemist on the staff of the University of Wales, Aberystwyth, has been appointed agricultural chemist at the College of Agriculture, Durham.

MR. JAMES HAMILTON, sole partner of James Hamilton and Son, manufacturing chemists, Dundee, has been adopted as Moderate candidate for Dundee's First Ward at the municipal elections.

MR. and MRS. HENRY PEAK, of Ainsdale, near Southport, celebrated their golden wedding on September 5. Mr. Peak is managing director of John Peak and Co., Ltd., Bridgwater Chemical Works, Wigan.

MR. G. E. HOLDEN, O.B.E., M.Sc., F.I.C., chairman and joint managing director of the English Velvet and Cord Dyeing Association, has been appointed by the Board of Trade to

Mr. G. E. Holden.

be a member of the Dyestuffs Advisory Licensing Committee for a period of three years. The Board have re-appointed MR. PETER CALDWELL, MR. D. R. MACKAY and PROFESSOR JAMES KENNER, F.R.S., to be members of the Committee for a further period of three years.

LORD NIGEL DOUGLAS-HAMILTON, Commissioner for the Special Areas in Scotland, is to perform the opening ceremony of the new distillery at Dumbarton on September 28. This distillery has been built for Hiram Walker and Sons (Scotland), Ltd., at a cost of £600,000.

DR. H. J. S. SAND, head of the department of inorganic and physical chemistry at the Sir John Cass Technical Institute, is retiring at Christmas. DR. E. DE BARRY BARNETT, at present head of the department of organic and applied chemistry, has been appointed head of the combined chemistry departments as from January 1, 1939.

MR. JOSEPH WAINWRIGHT, works director of Lever Bros., Port Sunlight, Ltd., this month celebrates 50 years' service with the company. He joined Lever Brothers at Warrington in September, 1888, and is one of the two still in active service who were with the company in that year. He was taught the art of soapmaking by his father. In 1898 he was sent by the late Lord Leverhulme to Boston, U.S.A., when Lever Bros. acquired the business of Curtis Davies, and Mr. Wainwright taught the staff there how to make "Sunlight" and "Lifebuoy" soaps.

MR. E. COLLINS has been appointed Government Analyst of Mauritius.

MR. EDWARD ARTHUR GLOVER, cement manufacturer, a director of Eastwoods Lewes cement, left estate valued at £22,367 (net personalty £15,087).

OBITUARY

MR. FREDERICK JAHN, founder of F. Jahn and Co., died at Clacton-on-Sea on August 30. Ill-health had for some years prevented his active participation in affairs.

MR. WILLIAM HARDING SCOTT, chairman and managing director of Laurence, Scott and Electromotors, Ltd., and a pioneer among electrical engineers in this country, died at his home, Oaklands, Thorpe St. Andrew, Norwich, on September 4, at the age of 76. Mr. Scott was one of the first to advocate the adoption of electrical engineering principles in the production of machinery for the Navy, and was awarded the O.B.E. for his services as chairman of the munitions output for East Anglia during the war.

DR. CHARLES C. CARPENTER, C.B.E., formerly president of the South Metropolitan Gas Co., died at his home at Chelsea on Wednesday. He was born in 1858 and, having received a scientific education at Birkbeck College, he entered the service of the South Metropolitan Co. at the company's Vaux-

Dr. Charles Carpenter.

hall works in the early eighties. He became chief engineer of the company in 1899 and was elected to the chairmanship of the board of directors in 1908. He was president of the Society of Chemical Industry in 1915-1917, being the Society's medallist in 1923. He played an active part in the formation of the Association of British Chemical Manufacturers.

Ten Years Back

From "The Chemical Age," September 8, 1928

Professor Wilhelm Ostwald, the eminent physical chemist, celebrated his seventy-fifth birthday on Sunday, September 2.

* * * *

The Home Secretary proposes to bring workers exposed to the danger of silica dust under the benefits of the Workmen's Compensation Act.

* * * *

Mr. S. M. Gluckstein, a director of J. Lyons and Co., died on Wednesday, August 29, aged 43. Among the work which he directed was the extensive chemical department of the firm.

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Water for the paper industry. Sheen and Wilson, *Paper Ind., 20,* 403-409.

Catalytic properties of active oxides. Schwab and Nakamura, *Ber., 71,* 1,755-1,762.

Electrolysis of alkali chlorides. Dony-Hénault and de Jaer, *J. Soc. Chem. Ind., 57,* 265-272.

Organic

Organic osmium compounds. Criegee, *Angew. Chem., 51,* 519-520.

Polycondensation of acrolein. Gilbert and Donleavy, *J. Amer. Chem. Soc., 60,* 1,911-1,914.

Carbamic esters from urea. Jacobsen, *J. Amer. Chem. Soc., 60,* 1,742-1,744.

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Thermal decomposition of oxalates. Günther and Rehaag, *Ber., 71,* 1,771-1777.

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Determination of formaldehyde in dilute solutions, Heim, *Ind. Eng. Chem. analyt. ed., 10,* 431.

Determination of potassium with Naphthol Yellow S. Frediani, *Ind. Eng. Chem. analyt. ed., 10,* 447-449.

Identification of manganese in minerals. Hoffmann, *Z. anorg. Chem., 238,* 385-394.

Determination of aluminium in cast iron. Taylor-Austin, *Analyst, 63,* 566-592.

Determination of nickel and boric acid in nickel-plating solutions. Smith, *Analyst, 63,* 593-596.

Determining the magnesia and lime content of salt. Tanne, *Chem. Ztg., 62,* 572-573.

Volumetric determination of glycerine in aqueous solutions. *Matières Grasses Pétrole et Derivés, 30,* 201.

Mineral Oils, Gas, Tar

Oxidation of naphthenic oils by oxygen. Iwanov, *Petroleum Z., 34,* No. 32, 1-7, No. 33, 1-7, No. 34, 1-6.

Gaseous hydrocarbons in petrol purification and synthesis. Engelhard, *Brennstoff Chem., 19,* 297-304.

Technical properties of producer gas. Knapp, *Glashütte, 68,* 553-556.

Purification, storage and separation of gaseous fuels. Schuster, *Chem. App., 25,* 243-246.

Cellulose, Paper

Preservation of wood. Peschek, *Osterreichische Chem. Ztg., 41,* 299-305.

Influence of nitric acid on wood. Seiberlich, *Paper Trade J., 107,* No. 3, 29-30.

Xanthation of soda cellulose. Scherer and Miller, *Rayon Text. Monthly, 19,* 478-479.

Mechanical pulp process research. Kanamaru, *Kolloid Z., 84,* 222-232.

Bleaching, Dyeing, Finishing

Processing of rayon and acetate rayon fabrics. Ordway, *Amer. Dyestuff Reporter, 27,* 431-438.

Chemical applications in the textile industry. Meunier, *Text. Imp. Blanch. App., 16,* 363-371.

Chemistry and dyeing of indigosols. Bader, *Amer. Dyestuff Reporter, 27,* 455-461, 467-471.

Milkiness of viscose rayon. Seiberlich, *Rayon Text. Monthly, 19,* 477.

Raw materials for the viscose rayon process. *Silk and Rayon, 12,* 870-872.

Protecting cellulose wool against carbonising acids. Ohl, *Kunstseide u. Zellwolle, 20,* 266-267.

Fluorescence of dyestuffs. Sen-Gupto, *J. Indian Chem Soc., 15,* 263-300.

Glass, Ceramics

Enamels poor in boric acid. Kirst, *Glasshütte, 68,* 540-542.

Effect of fluxes on cupola linings. Donoho and MacKenzie, *Bull. Amer. Ceram. Soc., 17,* 317-321.

Selenium ruby glass. Löffler, *Sprechsaal, 71,* 406-408.

Preparation of clay raw materials. Manfred, *Ber. Deutschen Keram. Ges., 19,* 283-285.

Metals, Electrometallurgy

Austenitic steels in the manufacture of organic acids. Marshall, *J. Australian Chem. Inst., 5,* 268-278.

High purity aluminium. Taylor and others. *Metals and Alloys, 9,* 189-192.

Vanadium in steel and iron. Priestly, *Metals and Alloys, 9,* 193-197.

Tarnishing of silver and its prevention. Price and Thomas, *Monthly J. Inst. Metals, 5,* 357-385.

Aluminium alloys and acid and alkaline solutions. Vosskühler, *Aluminium (Germany), 20,* 460-464.

Heavy nickel deposits. Westley, *Amer. Electro-Platers' Soc. Monthly Rev.,* 1938, 581-603.

Fats, Oils, Waxes

Manufacture of technical fats from animal carcases. Steinmann, *Fette u. Seifen, 45,* 338-342.

Maleic anhydride as colour reagent for ethereal oils. Sandermann, *Seifensieder Ztg., 65,* 553-554.

Elaidin from oil acids. Bertram, *Ole Fette Wachse,* 1938, No. 7, 1-4.

Concentration of cotton seed oil with superheated steam. Pyhälä, *Ole Fette Wachse,* 1938, No. 7, 4-6.

Developments in the manufacture of margarine. Robinson, *Oil and Soap, 15,* 203-206.

Synthetic soaps. Foulon, *Seifensieder Ztg., 65,* 606-608.

Paints, Pigments, Resins

Metallic naphthenates. *Paint Varnish Prod. Manager, 18,* 262-264.

Treatment of resins with monoglycerides. Schütze, *Fette u. Seifen, 45,* 357-358.

"Lac-drying oil" varnishes. Bhattacharya and Gidvani, *J. Soc. Chem. Ind., 57,* 285-288.

Fire- and water-proofing paints for iron and steel. Koritnig, *Korrosion u. Metallschutz, 14,* 253-258.

Iron oxides for protective paints. Stock, *Korrosion u. Metallschutz, 14,* 265-269.

Film thickness and the chemical composition of the paint film. Wolff, *Korrosion u. Metallschutz, 14,* 277-281.

Phthalic acid-glycerine artificial resin lacquers. Kolke, *Farben Ztg., 43,* 933-934, 959-961.

Artificial resin black lacquers. Ohl, *Nitrocellulose, 9,* 115-117.

Grinding media in paint technology. Courtney Bryson, *Paint Techn., 3,* 276.

Evaluation of ester resins for lacquers. Zeidler and Waghofer, *Paint Varnish Prod. Manager, 18,* 256-260.

Drying oils, driers and varnishes. Mundy, *Paint Varnish Prod. Manager, 18,* 266-274.

Rubber, Plastics

Artificial materials from cellulose derivatives and polymerization products. Mienes, *Kunststoffe, 28,* 196-200.

Abrasives for the artificial resin industry. Ohl, *Seifensieder Ztg., 65,* 597-600.

Examination of artificial resins and lacquers. Bandel, *Angew. Chem., 51,* 570, 575.

From Week to Week

IN A REVIEW NOTICE of Dr. Dean's book on "Utilisation of Fats" (THE CHEMICAL AGE, September 3, page 181) the author's name should have been printed as H. K. Dean.

CLAIMED TO BE THE FIRST CASE OF ITS KIND ever known, the death took place at Swansea last week of a two-year-old boy, Gareth Jones Grey, who had swallowed a tablet of "chemical fuel."

TWO BLAST-FURNACES belonging to the Shotts Iron Co., Ltd., have been re-started after being damped down for two months. The by-product plant, which is associated with the furnaces, is also to be restarted.

A PORTION OF THE SECOND GREENFIELD FACTORY of Courtaulds, Ltd., will shortly open for the production of staple fibre. If the whole of the second factory were opened employment would be provided for over 500 men.

NEW SOUTH WALES alone paid a third of the total petrol tax collected in Australia during the 12 months ending June 30 last, the respective figures being £3,000,000 out of £9,000,000. Since the Federal Aids Road Scheme came into operation in 1926 the Commonwealth has collected nearly £60,000,000 in petrol tax.

SOLOCHROMATE FAST GREY RAS, a new mordant dyestuff of Imperial Chemical Industries, Ltd., is suitable for dyeing worsteds and piece goods, and possesses very good fastness to washing and milling. It will prove of considerable interest to loose wool and slubbing dyers as an economical general purpose grey.

THE EMPIRE TEXTILE INSTITUTE, LTD., was registered on August 31, to establish an institute for fostering and advancing throughout the British Empire and elsewhere the utilisation of textile and other materials, fabrics, and other goods manufactured and produced in the United Kingdom and other parts of the British Empire.

THE CONTINENTAL RUBBER WORKS, A. G., of Hanover, is building factories covering four times as much ground as the firm's existing works. It is understood that practically the whole of these new works will be devoted to the production of "buna"—synthetic rubber. The first section of the new factory will be completed in the spring of next year.

HENRY, WIGGIN AND CO., LTD., have issued a small booklet in colour relating to selenium and the oxides and salts of nickel and cobalt, which are widely used in the glass and pottery industries. The booklet gives very briefly the purposes for which these chemicals are employed and aims to reproduce the colours given to the ware as exactly as possible.

SCOTTISH DISTILLERS are preparing for another busy year, but the making of whisky will be less than in 1937, because of the decline in American consumption. Many of the distilleries have undergone reconstruction in conformity with the new Factories Act, and respirators are being provided for workers employed in sheds where the grain throws off dust.

STATISTICS TELLING OF THE GROWTH of the British Industries Fair since 1915, are given in an illustrated booklet issued by the Department of Overseas Trade. In 1915, there was an attendance of 33,676; this year the attendance had grown to 380,031. There were 591 exhibitors at the Fair in 1915; in 1938 there were 2,432. The exhibiting area has grown from 88,714 square feet to 856,396 square feet.

A THERMIONIC AMPLIFIER FOR VOLTAGE MEASUREMENTS in high resistance circuits is described in a new catalogue of the Leeds and Northrup Co., Philadelphia. This instrument adapts any potentiometer of suitable range for glass electrode measurements and other measurements of potential in high resistance circuits. It is useful in polarisation studies, in measurements of corrosion and oxidation-reduction potentials, and in the measurement of resistors of high values.

A SCHEME IS NOW UNDER CONSIDERATION to protect Britain's oil and petrol reserves from aerial attack in time of war. The plans will be passed to the various oil and petrol producers concerned, and Government officials will co-operate in carrying out the recommendations. A director of Wakefields has disclosed that that company has already begun work on protective structures round its containers. These are built in the form of giant saucers, and will retain the oil in the event of tanks being damaged.

ACCORDING TO THE ALUMINIUM INFORMATION BUREAU, world consumption of aluminium has increased by 25½ per cent., but production has increased by about 34 per cent. World production in 1937, according to figures issued by the Metallgesellschaft, of Frankfort-on-Main, was 490,600 metric tons, equivalent to 482,900 long tons, and world consumption was 501,700 metric tons, equivalent to 493,800 long tons. The United States and Germany are by far the largest producers and consumers, together they accounted for 54 per cent. of world production in 1937.

TWO MEN WERE HURT in a fire on Thursday at the I.C.I. munition works at Linlithgow, near Edinburgh. The flames were extinguished within half an hour.

TOBACCO GROWN IN GERMANY is to be treated with peroxide to make it lighter in colour and to improve its appearance. About two million tons of tobacco are grown in Germany each year.

HENRY WIGGIN AND CO., LTD., have gathered together a considerable amount of information relating to Monel, nickel and Inconel, and have published this in the form of a data book. Of particular interest to the chemical industry are chapters on specific corrosives and the process industries. Tabulated weights of Monel in various forms are included to assist estimators.

RESTRICTIONS HAVE BEEN IMPOSED on the sale of two new drugs—benzedrine and sulphanilamide—under a Home Office order. From January 1 the sale of sulphanilamide will be forbidden except on a medical prescription. Benzedrine for internal use will come within the provisions of the poison law which require the purchaser to be known to the seller and to sign his name in the poison book.

THE LONDON AND EDINBURGH GAZETTES, dated September 6, give notice of the Secretary of State's intention to make rules amending the Poisons Rules, 1935, and an Order amending the Poisons List. Copies of the proposed amending Rules and Order may be obtained from the Stationery Office, price 2d. and 1d. respectively. Any representations should be made in writing addressed to the Under Secretary of State, Home Office, Whitehall, S.W.1, as soon as possible and in any case not later than October 17.

New Companies Registered

Cellulose Colour Company, Ltd. 343,870.—Private company. Capital £100 in 100 shares of £1 each. To carry on the business of paint manufacturers, manufacturers of and dealers in chemicals, colours, lacquers, varnishes, finishes and dyestuffs, etc. Subscribers: Robert S. Gordon, 16 Fairholme Road, Ilford; Millicent R. Ecob.

Ambora Soap Company, Ltd. 343,911.—Private company. Capital £5,000 in 5,000 shares of £1 each. To acquire as from June 30, 1938, the business of a soap manufacturer carried on by W. R. Warner at 393 New North Road, Islington, N., as "The Ambora Soap Works," and the trade mark 226079 connected therewith. Directors: Guy Alexander, 175 Knightsbridge, S.W.7; Mrs. Catherine E. Alexander, Wm. R. Warner. Registered office: 393 New North Road, N.1.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—The Madras and Southern Mahratta Railway Co., Ltd., invite tenders for 16 oil tank wagons (1 of 3,000 gallons capacity and 15 of 5,000 gallons capacity) for the Broad Gauge Section. Specification and form of tender can be obtained from the Company's Offices, 123 Victoria Street, Westminster, London, S.W.1. Tenders must be submitted not later than October 5, 1938.

Foreign Chemical Notes

Germany

THE CORROSIVE ACTION OF GASES used in high pressure and other catalytic reactions upon plant materials was discussed by Dr. H. J. Schiffler and Dr. E. Baeriecken before the Dechema Congress at Bayreuth (*Chemische Fabrik*, August 17). Steels resistant to high-pressure hydrogen now contain 3-7 per cent. chromium with small proportions of molybdenum and tungsten. Steel alloys with a high chromium content also stand up successfully to the conditions prevailing during the catalytic oxidation of ammonia to nitric acid. A high chromium content in nickel-free steels improves the resistance to sulphuretted hydrogen during petrol synthesis. A 4-6 per cent. chromium-molybdenum steel has been generally adopted in oil-cracking plants. Chromium-aluminium-silicon-steels with a high content of the alloy metals have been selected for the reaction furnaces in formaldehyde synthesis.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

MANUFACTURE OF AROMATIC AMINES.—A. Carpmael (I. G. Farbenindustrie.) 24510.

PRODUCTION OF PHOSPHATIDE PRODUCTS.—K. G. Deutsche Houghton Fabrik, and W. Rosenthal. (Germany, Sept. 6, '37.) 24370.

SILICATE-CLAY ADHESIVES.—E. I. du Pont de Nemours and Co. (United States, Aug. 26, '37.) 24515.

PRODUCTION OF LIGHT-FAST TANNING AGENTS.—J. R. Geigy, A.-G. 24326.

MANUFACTURE OF QUATERNARY NITROGEN COMPOUNDS.—J. R. Geigy, A.-G. (Switzerland, Aug. 20, '37.) 24327.

PRODUCTION OF N-ACYLURETHANES.—J. R. Geigy, A.-G. (Oct. 29, '37.) (Switzerland, July 12, '37.) 24811.

MANUFACTURE OF PHENYL-ISO-PROPYLAMINE.—A. Gerö. 24338.

MANUFACTURE OF NITROGENOUS ARTIFICIAL MATERIALS.—W. W. Groves (I. G. Farbenindustrie.) 24448.

PROCESS OF DYEING.—W. W. Groves (I. G. Farbenindustrie.) 24773.

MANUFACTURE OF SPLINTERLESS GLASS.—W. W. Groves (I. G. Farbenindustrie.) 24774.

MANUFACTURE OF ALIPHATIC POLYMERS OF ACETYLENE.—W. W. Groves (I. G. Farbenindustrie.) 24775

MANUFACTURE OF ARTIFICIAL RESINS.—W. W. Groves (I. G. Farbenindustrie.) 24776.

MANUFACTURE OF CONDENSATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) 24777.

FILTERS.—W. W. Groves (I. G. Farbenindustrie.) (Feb. 26, '37.) 24792.

POLYMERISABLE COMPOSITIONS.—F. T. Hamblin, L. W. Codd, and Imperial Chemical Industries, Ltd. 24518.

ELIMINATION OF IRON from sulphate, etc., of alumina.—E. Hayward. 24804.

METHOD OF, ETC., EFFECTING PRECIPITATION OF COMPOUNDS.—E. Hayward. 24805.

PRODUCTION OF OLEFINES.—E. Hene. 24511.

MANUFACTURE OF WASHING, ETC., AGENTS.—Henkel and Cie, Ges. (Germany, Oct. 2, '37.) 24954.

MANUFACTURE OF ARALKYL ETHERS of carbohydrates.—I. G. Farbenindustrie. (Germany, Aug. 18, '37.) 24383.

MANUFACTURE OF POLY-AZODYESTUFFS.—I. G. Farbenindustrie. (Germany, Aug. 19, '37.) 24507.

PRODUCTION OF ISOPROPYL ETHER.—I. G. Farbenindustrie. (Germany, Aug. 24, '37.) 24832.

UTILISATION OF GASEOUS MIXTURES which contain hydrogen halide, etc.—G. W. Johnson (I. G. Farbenindustrie.) 24465.

CARRYING OUT THE CONVERSION OF CARBON MONOXIDE with hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) 24683.

PICKLING IRON, ETC.—P. de Lattre. (Belgium, Aug. 21, '37.) 24581; (Belgium, Aug. 6.) 24582.

EXTRACTING, ETC., ERGOTOCIN.—E. Lilly and Co., and E. H. Stuart. (Dec. 1, '37.) 24485.

SEPARATION OF BENZOL from coke oven, etc., gases.—G. Maiuri. 24650.

MANUFACTURE OF HALOGENATED DERIVATIVES of ethylene polymers.—J. R. Myles, F. S. Bridson-Jones, and Imperial Chemical Industries, Ltd. 24830.

MANUFACTURING CYCLIC HYDROCARBONS from aliphatic hydrocarbons.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Aug. 27, '37.) 24494.

MANUFACTURE OF LUBRICANTS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Aug. 26, '37.) 24952.

ELECTROLYTIC PRODUCTION OF MANGANESE.—H. E. Potts (Atack). 24847.

METHOD, ETC., OF PRODUCING HYDROGEN PEROXIDE from solutions.—H. Schmidt. 24359.

CATALYTIC CONVERSION OF HYDROCARBONS.—Socony-Vacuum Oil Co., Inc. (United States, Sept. 1, '37.) 24600.

METAL-FABRICATING OILS.—Standard Oil Development Co. (United States, Nov. 12, '37.) 24412.

MANUFACTURE OF SOLUBLE LEAD SALTS.—W. J. Tennant (L. R. Birkenstein). 24376.

PREPARATION OF BILIRUBIN.—Armour and Co. (United States, Oct. 1, '37.) 25483.

CYCLIC SUBSTITUTED DICHLORINATED ALIPHATIC HYDROCARBONS, ETC.—Armour and Co. (United States, Nov. 12, '37.) 25484.

RESINOUS COMPOSITIONS.—Armour and Co. (United States, Nov. 12, '37.) 25485.

DIESTERS OF UNSATURATED GLYCOLS, ETC.—Armour and Co. (United States, Nov. 22, '37.) 25486.

COMPOSITIONS FROM RUBBER and fatty acids, etc.—Armour and Co. (United States, Dec. 13, '37.) 25487.

DEALKYLATION OF ALKYL SUBSTITUTED PHENOLS.—Bakelite, Ltd. (United States, Sept. 14, '37.) 25430.

MANUFACTURE OF DERIVATIVES OF SULPHONAMIDES.—Boots Pure Drug Co., Ltd., A. Cohen, and F. L. Pyman. 25423.

MANUFACTURE OF MERCAPTOBENZTHIAZOLE DERIVATIVES.—W. Baird, A. G. Murray, and Imperial Chemical Industries, Ltd. 25535.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. (United States, Aug. 31, '37.) 25414.

MANUFACTURE, ETC., OF SOLVENT, ETC., AGENTS.—Deutsche Hydrierwerke, A.-G. (Germany, Aug. 31, '37.) 25527; (Germany, Dec. 10, '37.) 25528; (Germany, Dec. 11, '37.) 25529; (Germany, March 17.) 25530.

TREATMENT OF HYDROCARBONS.—Gasoline Products Co., Inc. (United States, Aug. 31, '37.) 25020.

TIN, ETC.—W. V. Gilbert. 25203.

COPPER, ETC.—W. V. Gilbert. 25264.

ZINC, ETC.—W. V. Gilbert. 25442.

MANUFACTURE OF SUCCINIC ANHYDRIDE.—S. J. Green, and A. R. Lowe, and Imperial Chemical Industries, Ltd. 25419.

MANUFACTURE OF BASIC DOUBLE ETHERS of the quinoline series. W. W. Groves (I. G. Farbenindustrie.) 25106.

MANUFACTURE OF PANCREAS HORMONE PREPARATIONS.—W. W. Groves (I. G. Farbenindustrie.) 25285.

MANUFACTURE OF CONDENSATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) 25367.

MANUFACTURE OF SOLID POLYMERIC FORMALDEHYDE.—W. W. Groves (I. G. Farbenindustrie.) 25499.

MANUFACTURE OF DIMETHYLISOPROPYLACETIC ACID.—W. W. Groves (I. G. Farbenindustrie.) 25500.

MANUFACTURE OF HYDRAZINOALKYL SULPHONIC ACIDS.—W. W. Groves (I. G. Farbenindustrie.) 25501.

POLYMERISING OLEFINES.—Gutehoffnungshütte Oberhausen, A.-G. (Germany, Aug. 26, '37.) 25095.

POLYMERISATION OF MONOMERIC PRODUCTS.—I. G. Farbenindustrie. (Germany, Aug. 25, '37.) 25036.

MANUFACTURE, ETC., OF SYNTHETIC TANNING MATERIALS.—I. G. Farbenindustrie. (United States, Aug. 26, '37.) 25151.

MANUFACTURE OF POLYAZO DYESTUFFS.—I. G. Farbenindustrie. (Germany, Aug. 27, '37.) 25240.

MANUFACTURE OF AQUEOUS SOLUTIONS of polyvinyl-methyl ketone, etc.—I. G. Farbenindustrie. (Germany, Aug. 31, '37.) 25284.

MANUFACTURE OF WATER-INSOLUBLE AZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, Aug. 30, '37.) 25310.

MANUFACTURE, ETC., OF SYNTHETIC TANNING-AGENTS.—I. G. Farbenindustrie. (April 8.) 25397.

PREPARATION OF RENNIN.—H. L. Keil, and B. K. Stout. 25482.

PRODUCTION OF NON-KNOCKING BENZINES.—Naamlooze Vennootschap. Internationale Hydrogeneerings-Octrooien Maatschappij International Hydrogenation Patents Co. (Germany, Sept. 10, '37.) 25458.

Complete Specifications Open to Public Inspection

AROMATIC POLY-ETHER CHLORIDES.—Rohm and Haas Co. Feb. 24, 1937. 12671/37.

METHOD OF PRODUCING HYDROCARBONS and employment thereof. F. Rostler, and V. Mehner. Feb. 26, 1937. 17009/37.

REFINING OF LIGHT HYDROCARBON OIL.—Kohle und Eisenforschung Ges. Feb. 24, 1937. 21604/37.

RECOVERY OF GASOLINE.—Houdry Products Corporation. Feb. 27, 1937. 1656/38.

PROCESS FOR THE PRODUCTION OF BUTANDIOL-1 : 3.—Consortium Fur Elektrochemische Industrie, Ges. Feb. 24, 1937. 5484/38.

PROCESS FOR THE PRODUCTION OF BUTANOL-1-ONE-3.—Consortium Fur Elektrochemische Industrie Ges. Feb. 24, 1937. 4585/38.

PRODUCTION OF LEAD TITANATE PIGMENTS.—Titan Co., Inc. Feb. 23, 1937. 5619/38.

ORGANIC OXIDATION PRODUCTS OF FATTY MATTER and process of preparing the same.—J. R. Short Milling Co. Feb. 23, 1937. 5742/38.

RECOVERY OF SOLVENT MIXTURES used for refining or dewaxing hydrocarbon oils.—Edeleanu Ges. Feb. 25, 1937. 5875/38.

PRODUCTION OF ARTIFICIAL RESINS.—Allgemeine Elektricitats-Ges. Feb. 26, 1937. 6170/38.

EXTRACTION OF WASTE AQUEOUS LIQUIDS containing phenols.—Chemische Fabrik von Heyden, A.-G. Feb. 26, 1937. 6247/38.

MANUFACTURE OF SUBSTITUTED ANTHRAQUINONES and alkcylbenzoic acids.—I. G. Farbenindustrie. Feb. 27, 1937. 6248/38.

MANUFACTURE OF 1 :3-BUTYLENE-GLYCOL.—I. G. Farbenindustrie. Feb. 27, 1937. 6249/38.

PRODUCTION OF CAST SYNTHETIC RESINS.—K. Loos. Feb. 27, 1937. 6266/38.

MANUFACTURE OF ENOLIC ETHERS OF KETO-CYCLOPENTANO-POLYHYDRO-PHENANTHRENE COMPOUNDS.—Schering, A.-G. Feb. 26, 1937. 6316/38.

PROCESS FOR THE MANUFACTURE OF β-ALKYL-SUBSTITUTED ETHYLAMINE DERIVATIVES.—Schering, A.-G. Feb. 26, 1937. 6317/38.

MANUFACTURE OF MIXED ETHERS.—Standard Alcohol Co. Jan. 22, 1937. (Divided out of 5963/37.) 23021/38.

Specifications Accepted with Dates of Application

MANUFACTURE OF ALIPHATIC DIAMINES.—E. C. G. Clarke (E. I. du Pont de Nemours and Co.). Nov. 16, 1936. (Convention date not granted.) 490,922.

PRODUCING LUBRICATING OILS.—Ruhrchemie, A.-G. Dec. 20, 1935. 490,930.

SYNTHETIC RESINOUS-COMPOSITIONS.—E. I. du Pont de Nemours and Co., W. W. Smith, and D. E. Edgar. Dec. 21, 1936. 490,931.

VITAMIN PRODUCTS.—Kodak, Ltd. (Eastman Kodak Co.). Dec. 23, 1936. 491,007.

CATALYSTS.—W. W. Groves (I. G. Farbenindustrie.) Jan. 26, 1937. 491,143.

MANUFACTURE OF TANNING AGENTS.—I. G. Farbenindustrie, and W. W. Groves. Feb. 20, 1937. (Sample furnished.) 491,072.

PROCESS FOR THE MANUFACTURE OF COMPOUNDS of the etiocholane series.—Schering-Kahlbaum, A.-G. March 2, 1936. 491,014.

MANUFACTURE OF RUBBER CHLORIDE COMPOSITIONS.—Raolin Corporation. March 17, 1936. 491,075.

MANUFACTURE OF RUBBER CHLORIDE COMPOSITION.—Raolin Corporation. March 17, 1936. 491,015.

MANUFACTURE OF AZO-DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) Feb. 23, 1937. 490,941.

PROCESS FOR THE MANUFACTURE OF HIGHLY-CONCENTRATED SOLUTIONS of fat soluble hormones and derivatives thereof.—A. Carpmael (I. G. Farbenindustrie.) Feb. 23, 1937. 490,942.

MANUFACTURE OF NITROGEN CHLORINE COMPOUNDS.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. Feb. 28, 1936. 491,148.

MANUFACTURE AND PRODUCTION OF AZO-DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 24, 1937. (Samples furnished.) 491,019.

PRODUCTION OF ACTIVATED GELATIN PREPARATIONS in finely divided form.—Glaxo Laboratories, Ltd., and S. Reynolds. Feb. 24, 1937. 491,212.

PROCESS FOR THE MANUFACTURE OF DYESTUFFS, and their application for the dyeing and printing of cellulose esters and ethers. A. Carpmael (I. G. Farbenindustrie.) Feb. 24, 1937. 490,945.

CATALYTIC PYROLYSIS OF HYDROCARBONS.—A. L. Mond (Universal Oil Products Co.). Feb. 25, 1937. 490,853.

CONVERSION OF OLEFINES INTO LIQUID POLYMERS.—Universal Oil Products Co. March 11, 1936. 490,854.

LIQUID HYDROCARBON COMPOSITION derived from gaseous olefines, and process for the production thereof.—A. L. Mond (Universal Oil Products Co.). Feb. 25, 1937. 490,855.

MANUFACTURE OF DYESTUFFS of the phthalocyanine series.—I. G. Farbenindustrie. Feb. 26, 1937. 491,151.

PRODUCING DIESEL OILS.—Ruhrchemie, A.-G. March 4, 1936. 491,221.

PROTECTION OF MAGNESIUM and magnesium alloys against corrosion.—J. Frasch, and S. Fratkine. Feb. 26, 1936. 491,025.

MANUFACTURE OF ETHERS.—Standard Alcohol Co. Feb. 27, 1936. 491,227.

MANUFACTURE OF EMULSIONS.—E. E. Mayer, and M. Rothwell. Feb. 27, 1937. 491,229.

PROCESS FOR THE MANUFACTURE OF ORTHOTOLYLBIGUANIDE from orthotoluidine and dicyanodiamide.—Montecatini, Soc. Generale per L'Industria, Mineraria Ed Agricola. Feb. 29, 1936. 491,163.

MANUFACTURE AND PRODUCTION OF TERTIARY ALIPHATIC AMINES. I. G. Farbenindustrie. March 24, 1937. 491,036.

MANUFACTURE AND PRODUCTION OF AZO-DYESTUFFS.—I. G. Farbenindustrie. April 16, 1937. 490,958.

MANUFACTURE OF AZO-DYESTUFFS.—Durand and Huguenin, A.-G. May 28, 1936. 490,965.

WETTING AND PENETRATING AGENTS for alkali lyes.—Chemical Works, formerly Sandoz. Aug. 3, 1936. 491,048.

COLOURED CEMENTS and their process of manufacture.—P. Gerimont. Feb. 10, 1937. 491,051.

MANUFACTURE AND TREATMENT OF CELLULOSE COMPOUNDS.—British Celanese, Ltd. Sept. 30, 1936. 491,119.

MANUFACTURE OF ACETYL CELLULOSE.—Dr. A. Wacker Ges. Fur Elektrochemische Industrie. Oct. 27, 1936. 491,123.

ALUMINIUM-BASE ALLOYS and process for improving same.—I. G. Farbenindustrie. Jan. 16, 1937. 491,125.

RACEMISATION AND IRE-ARRANGEMENT OF OPTICALLY-ACTIVE EPHEDRINE and pseudo-ephedrine.—E. Boehringer, A. Boehringer, J. Liebrecht, and I. Liebrecht (Geb. Boehringer). Nov. 4, 1937. (Convention date not granted.) 490,979.

METHOD OF PRODUCING GUAIACOL COMPOUNDS.—S. Rosenzweig. Dec. 31, 1936. 490,991.

LATEX COMPOSITIONS.—Belvedere Chemical Co., Ltd. Feb. 13, 1937. 490,905.

MANUFACTURE OF CELLULOSE COMPOUND COMPOSITIONS.—Standard Oil Development Co. May 15, 1937. 491,199.

REMOVING CARBONIC OXIDE from combustible gases.—R. Brandt. March 29, 1938. 490,920.

MANUFACTURE OF RUBBER.—Raolin Corporation. March 17, 1936. 491,138.

MANUFACTURE OF RUBBER CHLORIDE COMPOSITIONS.—Raolin Corporation. March 17, 1936. 491,141.

COMPANY MEETING.

Beechams Pills Limited

Increase of Capital Approved

Mr. Philip E. Hill's Speech

A separate meeting of the deferred shareholders of Beechams Pills, Ltd., was held on Wednesday, September 7, at the Hotel Victoria, Northumberland Avenue, W.C., to consider a resolution increasing the capital of the company by the creation of 3,600,000 deferred shares of 5s. each; capitalising £600,000 standing to the credit of general reserve to be distributed as fully paid deferred shares of 5s. each to the existing deferred shareholders; sub-dividing each 5s. deferred share into two deferred shares of 2s. 6d. each; and altering the Articles of Association so as to maintain the existing balance of voting power between the three classes of shares.

Mr. Philip E. Hill (chairman of the company) presided.

The secretary, Mr. B. L. Hobrow, A.C.A., having read the notice convening the meeting, the Chairman said: Ladies and gentlemen, since we last met my co-directors and I have evolved the scheme to which I referred at our annual meeting, for making the deferred shares of the company a more marketable unit at a price within the reach of all classes of our customers and the general public. I wrote to you on the 15th August giving full particulars as to how this was to be effected, and, judging from the numerous letters I have received from shareholders and others, and from the comments of the financial Press, the scheme appears to be generally acceptable.

Purchase of Macleans, Ltd.

You will also have noticed from my letter that we have purchased the whole of the ordinary share capital of Macleans, Ltd., the well-known manufacturers of Macleans' Stomach Powder, Fynnon Salts, Macleans' Peroxide Tooth Paste, and a large number of other pharmaceutical and branded products. I consider this acquisition as one of the most important made by this company, not only from the point of view of the dividends we shall receive from Beecham Maclean Holdings, Ltd., the company formed by Beechams Pills, Ltd., to hold these shares, but from the savings in expenditure which should result from the acquisition and the benefit of the pooling of the management experience of this highly successful business.

You will have seen from the notices sent you that the balance of voting power of the three classes of shareholders in the company has been maintained. Trading conditions continue to be satisfactory, and, as you are aware, we have just paid the same interim dividend as last year on the increased capital. Upon the proposals of the directors receiving your assent to-day, it is proposed to make an issue of 2,400,000 deferred shares of 2s. 6d. each, on attractive terms, almost immediately. Preferential consideration in allotment will be given to holders of shares of all classes in the company and its subsidiaries.

Interesting Developments

During the past seven years your company has shown an expansion of business and profits and there appears to be no reason why this progress should not continue. At the moment we have negotiations in progress which may shortly lead to interesting developments. The prospectus, when published, will give all the necessary information to enable shareholders to form their own views with regard to the attractiveness of the proposals.

The chairman concluded by moving the resolution, which was seconded by Mr. J. Stanley Holmes, M.P. (managing director), and carried unanimously.

At a subsequent extraordinary general meeting of the company the proposals were also approved.

Weekly Prices of British Chemical Products

TRADING conditions in the market for industrial chemicals have shown very little material change during the past week, the market continuing to feature steady and satisfactory activity. So far as fresh contract business is concerned, a little better interest has been in evidence and deliveries being called for against existing contracts are reported to be satisfactory. There are no important price changes to record for general chemicals, rubber chemicals and wood distillation products and values remain steady as quoted last week. The market position for coal tar products also shows little change. A fair volume of inquiry is reported for a number of items and values remain on a steady basis.

Price Changes

Rise: Tolnol, 90%; pure.

MANCHESTER.—Although, on the whole, there is a fair movement of contract supplies of heavy chemicals into consumption against contracts, the bulk of the new business on the Manchester market during the past week has been on little more than a hand-to-mouth basis. Political nervousness has had a noticeably quietening influence on operations. For the most part, however, quotations are on a steady basis. There has been little noticeable improvement in the volume of buying on the by-products market, but rather less weakness has been apparent.

GLASGOW.—Business in chemicals has again been very quiet during the week both for home trade and export. Prices, however, still remain very steady with no important changes to report.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 2s. 6d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £18 10s. per ton, d/d U.K. Fine white, 98%, £17 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 3½d. per lb. d/d station in 70-lb. cylinders (1-ton lots).

CHROMETAN.—Crystals, 2⅞d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—10d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0¼d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 10s. per ton f.o.b. SCOTLAND: £18 15s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 17s. 6d. to £4 17s. 6d. per cwt. according to quantity; in drums, £3 10s. 0d. to £4 2s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £30; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.), 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH CAUSTIC.—Solid, £35 5s to £40 per ton according to quantity, ex store; broken, £42 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5¼d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 11¼d.

POTASSIUM PRUSSIATE.—6¼d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6¼d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 11s. per ton.
SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.
SODA, CAUSTIC.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.
SODIUM BICARBONATE.—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.
SODIUM BISULPHITE POWDER.—60/62%, £14 10s. per ton d/d in 2-ton lots for home trade.
SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.
SODIUM CHROMATE.—4½d. per lb. d/d U.K.
4d. per lb. GLASGOW: 4½d. net, carriage paid.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
SODIUM PRUSSIATE.—½d. per lb. for ton lots. GLASGOW: 5d. to 5¾d. ex store. MANCHESTER: 4½d. to 5½d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb. GLASGOW: 1s. 1d. per lb., 5%, ex store.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—3s. 9d. to 4s. per lb.
CARBON BLACK.—3¾d. to 3 15/16d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 10½d. to 11d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¾d. to 5¼d. per lb.; dark 3¾d. to 4¼d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 4s. 9d. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1938.
SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. per gal.; crude, 11½d. to 1s. per gal.
CARBOLIC ACID.—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 1s. 10½d. to 2s. 1½d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
CREOSOTE.—Home trade, 4¾d. per gal., f.o.r. makers' works; exports 6¾d. to 6¾d. per gal., according to grade. MANCHESTER: 4½d. to 5d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils 5¾d. to 6½d.
CRESYLIC ACID.—97/99%, 1s. 9d. to 2s.; 99/100%, 2s. 6d. to 3s. 6d. per gal., according to specification; Pale, 99/100%, 2s. 1d. to 2s. 3d.; Dark, 95%, 1s. 7d. to 1s. 8d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 2s.
NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £5 to £6 per ton; purified crystals, £11 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free) MANCHESTER: Refined, £13 10s. to £14 per ton, f.o.b.
PITCH.—Medium, soft, 33s. per ton, f.o.b. MANCHESTER: 31s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
PYRIDINE.—90/140%, 11s. 6d. to 13s. 6d. per gal.; 90/160%, 9s. 6d. to 10s. 9d. per gal.; 90/180%, 2s. 6d. to 3s. 6d. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 8s. to 9s. 6d. per gallon.
TOLUOL.—90%, 1s. 11d. per gal.; pure, 2s. 3d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 15s. to £9 5s. MANCHESTER: Brown, £8 10s.; grey, £10.
METHYL ACETONE.—40.50%, £36 to £38 per ton.
WOOD CREOSOTE.—Unrefined, 4d. to 6d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. 3d. to 3s. 6d. per gal.
WOOD TAR.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 9½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works
H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL —£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 4¾d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—10½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works
o-TOLUIDINE.—11d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 11d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 8d per lb., 100%.

Commercial Intelligence

Mortgages and Charges

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CONDY AND MITCHELL, LTD., London, E.C., manufacturing chemists. (M., 10/9/38.) August 29, £300 debenture to H. J. B. Condy, London, and others; general charge. *£3,275. January 4, 1938.

J. HOLROYD AND CO., LTD., Huddersfield, dyers. (M., 10/9/38.) August 30. Trust Deed dated August 29, 1938, securing £7,500 debenture stock, present issue £2,000; general charge. *£20,066. November 27, 1937.

STANDARD PULVERISED FUEL CO., LTD., London, W.C. (M., 10/9/38.) August 25, £6,000 debentures, part of series already registered. * Nil. January 5, 1938.

Declarations of Solvency Filed

N. P. GARSIDE, LTD., Nelson, paint and varnish manufacturers. (D.S.F., 10/9/38.) August 27.

W. F. BUCKLAND, LTD., Cardiff, paint manufacturers. (D.S.F., 10/9/38.) August 31.

Company News

Wright, Layman and Umney, Ltd., announce an interim of 2½ per cent., less tax (same).

Lafarge Aluminous Cement Co., Ltd., announce net profit for the year to March 31, at £32,464 (£44,561). To tax and N.D.C., £18,698; to preference dividend equalisation reserve, £2,600 (same); to general reserve, £5,000 (£15,000); dividend of 10 per cent., less tax, on ordinary (same); forward, £1,685 (£1,632). Report states that, in view of expansion of company's business, directors consider it advisable that authorised capital should be increased to £150,000 by the creation of a further 180,000 ordinary shares of 5s. each.

Egyptian Salt and Sodor Co., Ltd., of 40 and 41 Old Broad Street, E.C.2, has increased its nominal capital by the addition of £100,000 in £1 ordiary shares, beyond the registered capital of £500,000.

Freers Chemical Works, Ltd., of Great Western Trading Estate, Park Royal Road, N.W.10, has increased its nominal capital by the addition of £2,000 in £1 ordinary shares beyond the registered capital of £2,000.

Toja Products, Ltd., soap manufacturers, of Erskine Road, Primrose Hill, N.W.3, has increased its nominal capital by the addition of £5,150 beyond the registered capital of £100. The additional capital is divided into 4,900 ordinary shares of £1 and 5,000 deferred shares of 1s.

Celanese Corporation of America announces payment of $2 per share on the $14,818,000 outstanding balance of 7 per cent. first participating preferred stock. The last payment made on this stock was in March last, when $1.53 per share was paid, representing the participating dividend in respect of 1937.

Imperial Smelting Corporation has, during the last six months, been unable to earn the full dividend on its 6½ per cent. cumulative preference shares. The directors have accordingly decided to pay 1¼ per cent., making a total of 4½ per cent. for the year ended June 30 last. Last year the company resumed dividends on its ordinary shares, after a lapse of six years, with a payment of 5 per cent., less tax.

Ketton Portland Cement Co., Ltd., in their report announce a net profit of £40,203 for the year ended June 30 last, compared with £33,007 for 1936-37. Total profit amounted to £77,062, against £65,702 in the previous year. The sum of £20,000 is again transferred to depreciation, making a total of £120,000, and tax took £15,431 against £11,282. As already announced, the company is paying a final dividend of 8¾ per cent., less tax, making a total of 15 per cent., less tax, for the year, compared with 12½ per cent. for the preceding twelve months. The participating preference shares qualify for a participation of 1½ per cent., making the year's dividend 9 per cent., against 8½ per cent.

Forthcoming Events

London.

September 16-October 1.—The Building Exhibition, Olympia.

September 19-23.—Chemists' Exhibition, Royal Albert Hall, Kensington, S.W.7.

Glasgow.

September 16-20.—The Society of Chemical Industry. Special Autumn Meeting.

Oxford.

September 15-17.—The Faraday Society. University of Oxford. General Discussion on "Luminescence."

September 21-26.—International Conference for Documentation. Lady Margaret Hall.

Chemical and Allied Stocks and Shares

SINCE the beginning of the new Stock Exchange account the undertone in industrial and other securities has shown some improvement, largely owing to more hopeful views as to the outcome of European political developments. The lower unemployment figures were also a helpful factor, but at the time of writing the volume of business in the stock and share markets has not shown any appreciable improvement.

Owing to the small amount of business passing, the tendency still is for only moderate buying or selling to influence prices of individual shares very sharply. Many shares of companies connected with the chemical and allied trades have a large following and, as mentioned here before, therefore, tend to move closely with the general trend of markets. In sympathy with the rather firmer market conditions British Oxygen have improved to 68s. 9d., at the time of writing, which compares with 65s. 7½d. a week ago. Imperial Chemical were also better, awaiting the interim dividend, and are 31s., a gain of 6d. on balance. Turner and Newall have put on 2s. to 78s., and British Aluminium were better at 48s. 9d., as were Tube Investments at 78s. 9d.

Demand was reported for Murex ordinary shares which were 75s. 7½d. a week ago, and have risen to 77s. 6d. at the time of writing. Results of this company are due shortly and estimates of the total dividend for the year range up to 25 per cent. in the market. B. Laporte have been fairly steady around 86s., at which on the basis of last year's 22½ per cent. dividend an apparently over-generous yield is offered, particularly as earnings on the shares last year exceeded 40 per cent. The directors will, no doubt, continue to deal conservatively with profits, but the assumption in the market is that the forthcoming interim dividend is likely to be maintained.

Associated Portland Cement were firmer at 77s. 9d., pending declaration of the interim payment, which in this case is now imminent. British Plaster Board have rallied 1s. 3d. to 26s. 6d. and, although "ex" the interim dividend, Pinchin Johnson at 28s. 9d. are 6d. better than a week ago. International Paint, Indestructible Paint and other paint shares were steady. Wall Paper deferred units remained at 35s. 6d. This company's preliminary figures are expected to be issued towards the end of next month. United Glass Bottle are 1s. lower at 47s. 6d., but this partly reflects deduction of the interim dividend from the price. Triplex Glass shares attracted rather more attention on annual meeting considerations, but at 30s. 9d. are virtually the same as a week ago.

Boots Pure Drug have improved from 39s. 9d. to 40s. 6d. at the time of writing, but Timothy Whites and Taylors moved down slightly from 25s. to 24s. 6d. Sangers kept at 22s. 10½d., while British Drug Houses were again around 21s. Fison Packard and Prentice remained under market dividend estimates and continued to change hands at 35s. Cooper McDougall and Robertson were quoted at 27s. 6d.; declaration of the interim dividend is due shortly.

United Steel ordinary units have been a better market and are 22s. 6d., which compares with 21s. 9d. a week ago, awaiting the results. Colvilles improved to 20s. 9d., and Dorman Long, Guest Keen and various other iron and steel shares were also moderately better in price. Staveley Coal and Iron, however, have moved down from 45s. 9d. to 42s. 6d. xd, the dividend being below general market estimates. No doubt the full results will show that the directors are again dealing very conservatively with profits.

"Shell," Royal Dutch and other leading oil shares have made moderate recovery from their recent sharp decline, while Trinidad Leaseholds and Burmah Oil were also slightly better.